This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

**Usage guidelines**

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

**About Google Book Search**

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

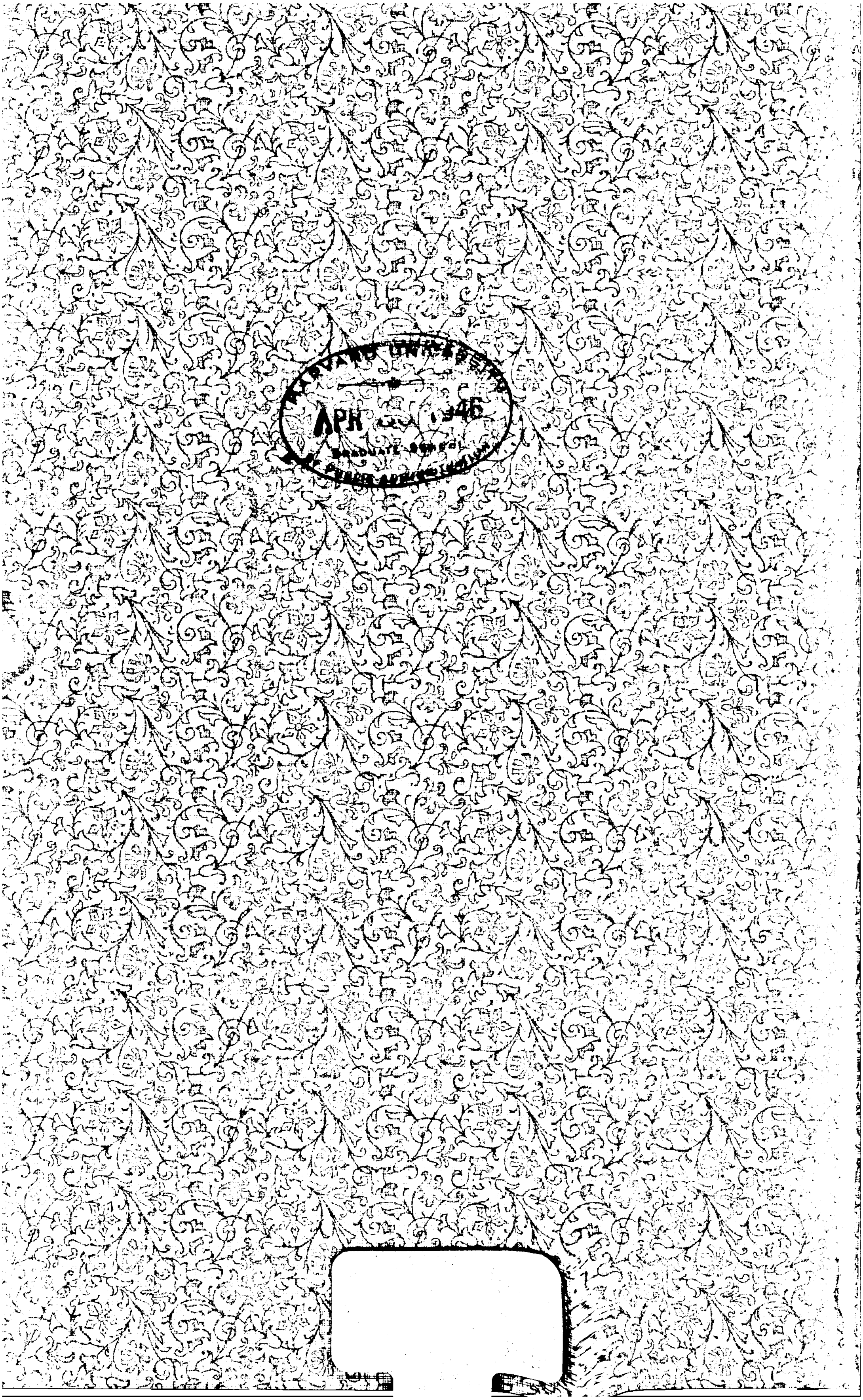
LITTAUER LIBRARY
LI 2X4D 5

THE CITY OF NEW YORK.

# DEPARTMENT OF WATER SUPPLY

## FIRST ANNUAL REPORT,

1898.



HARVARD UNIVERSITY
APR 30 1946
GRADUATE SCHOOL
OF PUBLIC ADMINISTRATION

MUNICIPAL REFERENCE
LIBRARY
RECEIVED
FEB 21 1942
MUNICIPAL BUILDING
CITY

# FIRST ANNUAL REPORT

OF THE

# Department of Water Supply

OF

# THE CITY OF NEW YORK.

---

## 1898.

---

NEW YORK:
THE MARTIN B. BROWN COMPANY, PRINTERS AND STATIONERS,
NOS. 49 TO 57 PARK PLACE.
1899.

Municipal Reference Library
BRANCH OF
NEW YORK PUBLIC LIBRARY
MUNICIPAL BUILDING

HARVARD UNIVERSITY
APR 30 1946
GRADUATE SCHOOL
OF PUBLIC ADMINISTRATION

Exch
N.Y. State Lib.

# CONTENTS.

PAGE

INTRODUCTION ... 1

BOROUGH OF MANHATTAN AND THE BRONX—

- Croton Watershed ... 4
  - Reservoir, capacity of ... 4
  - Drafts on storage reservoirs ... 5
- Sanitary protection of water supply ... 5
- Bronx and Byram Watersheds ... 6
  - Reservoirs, capacity of ... 6
- Sanitary protection of supply ... 6
- Aqueducts and conduits ... 6
- Distributing mains ... 7
  - Length of, laid in 1898 ... 8
  - Total length, December 31, 1898 ... 8
  - Maintenance and repairs ... 8
- Use and waste of water ... 9
- High service supply ... 10
- Private water company ... 11
- Total cost of Croton, Bronx and Byram systems ... 12

BOROUGH OF BROOKLYN—

- Description of water system ... 12
  - Sources ... 12
  - Reservoirs and ponds ... 13
  - Driven well stations ... 14
  - Conduit lines ... 15
  - Reservoirs, receiving and distributing ... 16
  - Pumping-engines ... 17
  - Distributing mains ... 17
  - Gravesend water plant ... 18
  - New Utrecht water plant ... 19
  - Laboratory ... 19

PAGE

BOROUGH OF BROOKLYN—

Private water companies .......... 19
  Long Island Water Company .......... 19
  Flatbush Water Company .......... 19
  West Brooklyn Water Company .......... 20
  Blythebourne Water Company .......... 20
Work done in 1898 .......... 20
  On unfinished contracts .......... 21
  Maintenance and repairs .......... 22
    Pumping plants .......... 22
    Conduit lines, reservoirs and ponds .......... 22
    Distributing mains, etc. .......... 22
    Accident to 48-inch mains .......... 22
  Laboratory, analysis of water .......... 22
  Consumption of water .......... 24
  Present and future necessities .......... 25

BOROUGH OF QUEENS—

Long Island City water system .......... 27
  Description .......... 27
  Needs for improvement .......... 27
  Contract with Citizens' Water Supply Company .......... 28
Flushing water plant .......... 28
Private water companies .......... 30
  Citizens' Water Company .......... 30
  Jamaica Water Supply Company .......... 30
  Woodhaven Water Company .......... 30
  Wyckoff Heights Water Company .......... 30
  Queens County Water Company .......... 30

BOROUGH OF RICHMOND—

Tottenville water plant .......... 31
Private water companies .......... 31
  Crystal Water Company .......... 31
  Staten Island Water Company .......... 31
Fire-hydrant service by private companies .......... 31
New scale of water rents .......... 32
  Effect of water revenue on cost of maintenance and bond issues .......... 34
Revenue from the water service .......... 35
  Manhattan and Bronx .......... 35
  Brooklyn .......... 36
  Queens .......... 36
  Richmond .......... 37

PAGE
Summary of expenditures .......... 37
  Manhattan and Bronx .......... 37
  Brooklyn .......... 37
  Queens .......... 37
  Richmond .......... 37
  On bond issues .......... 38
  Recapitulation .......... 39
    Liabilities prior to 1898 .......... 39
    Comparison with 1897 .......... 39

# DEPARTMENT OF WATER SUPPLY.

## First Annual Report of the Department of Water Supply, City of New York, 1898.

Department of Water Supply—Commissioner's Office,
No. 150 Nassau Street,
New York, February 16, 1899.

*Hon.* Robert A. Van Wyck, *Mayor :*

Dear Sir—In compliance with section 457 of the Greater New York Charter, I have the honor to present herewith my report of the public business devolving on the Department of Water Supply for the year 1898.

Under the Charter there were consolidated into this Department:

First—From the former City of New York, the Bureau of Chief Engineer of the Croton Aqueduct, with all the works, lands and property pertaining to the supply of water from the Croton, Bronx and Byram rivers, and the Bureau of Water Register, having charge of the assessment and collection of water rents in the boroughs of Manhattan and The Bronx.

Second—From the former City of Brooklyn, those bureaus, officers, employees, works, lands and property of the former Department of City Works which appertained to, and were concerned in the supply of water to the population of the Borough of Brooklyn, and the collection of the water revenue.

Third—From the former county, city, town and village authorities in that part of Queens County which has been consolidated into Greater New York, and from the county, town and village authorities of the County of Richmond, all public property and all public functions and duties connected with the supply of water to the population, and the assessment and collection of charges for the public water supply.

As the water systems of the boroughs of Manhattan and The Bronx have been under one management since the annexation to the city of the towns of Morrisania, Fordham and West Farms, in 1873, they will continue to be so treated and considered under this Department, and in this and future reports. The systems in other boroughs will be treated and considered separately.

## BOROUGHS OF MANHATTAN AND THE BRONX.

### THE CROTON WATERSHED.

The drainage area of the Croton river and its affluents above the Croton dam is 338 square miles. Since 1866 the city has kept accurate records of the rainfall, first at only two stations, the Boyd's Corner Reservoir in the northwesterly part of the watershed, and at the Croton Dam, to which was added in 1878 the station at the East Branch Reservoir. The record of thirty-three years shows an average annual rainfall of 48 inches, with a minimum of 38.33 inches in 1895, and a maximum of 63.51 inches in 1888. For the year 1898, the rainfall was 56.28, or 8.28 inches above the average. In the driest of the thirty-three years, the average daily flow of the Croton river at the Croton Dam was 250,000,000 gallons, but even in a year of abundant rainfall, the flow may fluctuate between less than 30,000,000 gallons per day after a considerable period of dry weather, and upwards of 700,000,000 gallons per day after a heavy rainfall. Therefore, whenever the natural flow falls below the daily supply needed in the city, which under recent and present conditions may occur on from 100 to 200 days or more in the course of the year, recourse must be had to the water held in reserve in the storage reservoirs and lakes.

Prior to 1870 there was no reserve supply held in storage, except in the lake formed by the Croton Dam, which cannot be classed as a storage reservoir. In that year, the Commissioner of Public Works acquired the right to dam up the outlets of lakes Mahopac, Kirk, Gleneida, and Gilead and Barrett's Pond, and to draw down the water in case of need. The development and capacity of the system of storage reservoirs in the Croton watershed is shown in the following table :

| YEAR. | RESERVOIRS. | GALLONS CAPACITY. |
|---|---|---|
| 1870 | Lakes Mahopac, Kirk, Gleneida, Gilead and Barrett's Pond | 1,600,000,000 |
| 1873 | Boyd's Corners Reservoir | 2,700,000,000 |
| 1878 | Middle Branch Reservoir | 4,000,000,000 |
| 1891 | East Branch Reservoir | 8,000,000,000 |
| 1893 | Titicus Reservoir | 7,000,000,000 |
| 1895 | West Branch Reservoir | 10,000,000,000 |
| 1897 | Muscoot Reservoir | 7,000,000,000 |
| 1898 | White Pond Reservoir | 200,000,000 |
| | Total present capacity (gallons) | 40,500,000,000 |

The East Branch, West Branch and Titicus reservoirs were built under the direction of the Aqueduct Commissioners. The others were built under the direction of the former Department of Public Works, with the exception of the White Pond Reservoir. The contract for this was made by the Commissioner of Public Works, December 8, 1897, and the entire work has been done in 1898, under the direction of this Department. It is now completed so far that the outlet was closed on November 1, 1898, since which time the reservoir is gradually filling. All the other storage reservoirs are now full to the lips of the dams, and the Department is prepared, in case of necessity, to deliver a daily water supply of 200,000,000 gallons for 200 consecutive days, irrespective of the natural flow of the Croton river.

The Cornell Reservoir, which is in course of construction under the direction of the Aqueduct Commissioners, and is to be completed in 1902, will add 25,000,000,000 gallons to the storage.

During 1898 there were 112 days on which the flow of the river had to be supplemented by drafts upon the storage reservoirs, as follows:

| | Gallons. |
|---|---|
| From East Branch Reservoir | 3,430,000,000 |
| From West Branch Reservoir | 3,400,000,000 |
| From Middle Branch Reservoir | 400,000,000 |
| From Titicus Reservoir | 500,000,000 |
| From Muscoot Reservoir | 900,000,000 |
| Total | 8,630,000,000 |

### SANITARY PROTECTION OF WATER SUPPLY.

By chapter 189 of the Laws of 1893, the former Department of Public Works was authorized to expend $500,000 annually for the sanitary protection of the water supply at its sources and in its courses through the watersheds to the aqueducts and conduits, and for that purpose to acquire the title to lands, buildings and water rights along the streams and on the shores of reservoirs and lakes, where necessary for the removal or prevention of nuisances and establishments which tended to the pollution of the water. The power to institute legal proceedings for the taking of lands was, however, limited to four years from the passage of the act and expired March 23, 1897. Several legal proceedings for the acquisition of lands, etc., through Commissioners of Appraisal, which were instituted under the act, are still pending. The City has up to date acquired for sanitary protection in the Croton watershed, 2,166 acres of land along the East, West, Middle and Muscoot branches of the Croton river, around Lake Gleneida and White Pond, and in and around the villages of Mount Kisco, Towner's, Patterson, Brewsters and Carmel. More than half the area was in small parcels, occupied by houses, barns and outhouses, which had to be removed to prevent pollution of the adjacent streams. Under the regulations of the State Board of Health and with the co-operation of the City Board of Health many other nuisances were suppressed. This Department is steadily pursuing the measures authorized by the Act of 1893 and the general State law for the protection of potable waters used by cities, towns and villages. These measures include, besides the removal of nuisances from lands acquired by the city, the operation of an electrozone plant in the Village of Brewsters for the disinfection of the sewage, the dry-pan process for disposing of sewage and excrement in the Village of Mount Kisco, the patrolling of the water-courses and reservoirs to prevent and suppress pollution of the water, and the legal prosecution of offenders against the law and the regulations of the State Board of Health.

The total amount which has been expended under the Act of 1893 to December 1, 1898, is $2,445,015.56. Of this amount there has been paid in 1898, $514,368.92 for lands acquired by legal proceedings and for costs of the proceedings.

## BRONX AND BYRAM WATERSHEDS.

The drainage area of the Bronx river is 13⅔ square miles and that of the Byram river is 8⅛ square miles. Water was first obtained through the pipe-conduit from the Bronx river in September, 1884, at the rate of 10,000,000 gallons per day, which in subsequent years was increased to 14,000,000 gallons per day. In January, 1896, the supply from the Byram river was added, after which a daily supply of 17,000,000 gallons was received through the conduit. During the past year this has been increased to 19,000,000 gallons. The contract for the construction of the collecting reservoir on the Byram river was made by the Commissioner of Public Works on December 31, 1896; it was completed under the direction of this Department in May last, the final estimate for payment being made on June 1, 1898. The following is the present storage capacity in the Bronx and Byram watersheds:

| | Gallons. |
|---|---|
| Kensico Reservoir | 1,600,000,000 |
| Rye Ponds Reservoir | 1,300,000,000 |
| Byram Pond Reservoir | 800,000,000 |
| Total | 3,700,000,000 |

The demands on the water supply in the Borough of The Bronx, the Twenty-third and Twenty-fourth Wards of the old City of New York, has outgrown the capacity of the Bronx and Byram river system, which for some time past has been supplemented by a supply from the Croton Aqueducts. An engineering party is now engaged on surveys for additional sources of supply to the east and south of the Croton and Byram watersheds.

The measures for the sanitary protection of the water supply, which have been described in the preceding paragraph of this report, except the treatment of sewage in villages, are also applied to the Bronx and Byram watersheds, and are included in the expenditures therein stated. The city has acquired for this purpose 97 acres of land around the Kensico Reservoir, and 376 acres at Byram Pond and along Bear Gutter creek, an affluent of the Byram river.

## AQUEDUCTS AND CONTENTS.

For several years past the New Aqueduct has conveyed the entire water supply from the Croton river, which at the beginning of 1898 amounted to 214,000,000 gallons per day, was increased to 235,000,000 by the end of September, and thereafter diminished to 225,000,000 gallons per day in December. The Old Aqueduct had to be shut off since November, 1896, to make necessary changes in the structure in connection with the building of the Cornell Dam and the Jerome Park Reservoir by the Aqueduct Commissioners, and for the construction of an arched passageway where Burnside avenue, in the Borough of The Bronx, crosses the aqueduct. This archway was contracted for by the Commissioner of Public Works on November 20, 1896, under a special act of the Legislature and completed by this Department in June last at a total cost of $53,377.25, a portion of which is to be assessed on adjacent and benefited property. In October last the interior of the Old Aqueduct had been thoroughly cleaned out, and water was again let into it, first to a depth of two feet, which was afterwards increased to five feet. A leak was soon developed in the structure at the south abutment of the arch by which it crosses the Sing Sing Kill, in the Village of Sing Sing. The stability of the arch has not been endangered, but as soon as spring opens the south abutment will be reinforced and newly faced, and in the meantime the Old Aqueduct will again be closed.

The care of the two aqueducts and the Bronx river and Byram river conduits, the grounds and structures, storage and distributing reservoirs, dams, sluices, culverts, fences and roads embraced in the water system, has received constant and diligent attention.

The total conduit capacity for conveying water to the boroughs of Manhattan and The Bronx is: Old Aqueduct, 80,000,000 gallons per day; New Aqueduct, 300,000,000 gallons per day; Bronx and Byram river conduit, 20,000,000 gallons per day; total, 400,000,000 gallons per day.

### DISTRIBUTING MAINS, STOP-COCKS AND HYDRANTS.

Since 1875 there has been an annual appropriation in each year's tax levy, limited by law to $250,000, for the laying of water-mains to extend the water service into new streets, the appropriation to include cost of engineering, inspection and supervision as well as the contracts for furnishing and laying the mains. For the year 1898 the final estimate allowed $229,830 for the contract work of manufacturing and laying the mains. Against this appropriation four contracts have been made, viz.: One for the manufacture of pipes and special castings, amounting to $42,213, and one for the manufacture of stop-cocks and hydrants, $4,253.50, both of which were authorized by the Board of Public Improvements; and two contracts for laying water-mains in Fordham road, the Southern Boulevard and other streets, amounting to $92,681.50, which had been authorized in 1897. These contracts left a balance of $90,682 for work to be authorized by the Board of Public Improvements and the Municipal Assembly.

To meet the pressing demands for extension of the water service which were presented by property-owners and Local Improvement Boards, the Department forwarded to the Board of Public Improvements recommendations and drafts of resolutions and ordinances for authority to lay about 68,000 lineal feet, or nearly 13 miles of additional water-mains in more than 50 different streets, the aggregate estimated cost of which was approximately the amount of the available balance of $90,682 in the appropriation. The Board promptly approved these recommendations by resolutions which were forwarded to the Municipal Assembly. The Assembly, however, deferred action thereon until late in November and in December, when ordinances covering about 40 per cent. of the work recommended by the Department and approved by the Board of Public Improvements were passed, and promptly approved by your Honor. The measures for putting these works under contract are now under way, but about $50,000 of the appropriation for 1898 will remain unavailable for the much needed work of extending the water service into new streets and will lapse into the general fund of the city.

Under the three contracts above mentioned, and several unfinished contracts which came over to this Department from the former Department of Public Works, there were laid during the year, 2,034 lineal feet of 36-inch mains, 62 lineal feet of 20-inch mains, 9,521 lineal feet of 12-inch mains, and 20,410 lineal feet of 6-inch main; total, 32,027 lineal feet, or 6.06 miles of mains, with 62 stop cocks and 94 fire-hydrants.

The laying of additional water-mains has not been confined to the foregoing work of extending the water service into new streets and territory Coeval with the steady building up of vacant territory, there has, in recent years, been an immense and rapid expansion skyward of the older and densely built up part of Manhattan Island, by the erection of buildings of from ten to twenty and more stories in height, in place of buildings of five stories or less, which is assuming larger proportions from year to year. The new demands on the water service which this has created, outgrew the capacity of the distributing mains several years ago, resulting in great reduction of the pressure of water in the distributing mains and in the elevation at which the water could be delivered in the houses. The necessity for enlarging the distributing system in the central and lower sections of Manhattan Island on a scale hitherto unknown, and far beyond the means of annual appropriations, became imperative. The State Legislature brought relief by the enactment of chapter 669 of the Laws of 1896, which authorized a bond issue of $1,000,000 for this purpose. During 1896 and 1897 the Commissioner of Public Works made contracts, amounting in the aggregate to that sum, for the laying of several lines of large mains from the Central Park Reservoirs southward to different sections of the old distributing system, where the loss of pressure and elevation in the delivery of the water was most severely felt. One of these contracts, amounting to $104,315, was made on April 23, 1897, and was only about two-thirds finished when this Department took charge on January 1, 1898. It was completed in June last. The last of the contracts was made on December 6, 1897, amounting to $275,397. It was entirely performed during the past year under the direction of this Department, and is now completed with the exception of some minor finishing work. Under these contracts, there were laid during the year 1898: 41,019 lineal feet of 36-inch mains, 7,682 lineal feet of 20-inch mains, 5,511 lineal feet of 12-inch mains, and 2,631 lineal feet of 6-inch mains; total, 56,843 lineal feet, or 10.76 miles of mains, with 156 stop-cocks and 62 fire-hydrants.

The total length of new water-mains laid in 1898, under the annual appropriation, and under the bond issue authorized by the Act of 1896, is 16.94 miles, with 283 stop-cocks and 244 fire-hydrants, including new work done in the maintenance and repairs of the distributing system.

At the close of the year, the distributing system for the boroughs of Manhattan and The Bronx included 833.41 miles of water-mains and 8,804 stop-cocks, ranging in diameter from 4 inches to 48 inches, and 11,226 fire-hydrants.

For the purposes of maintenance and repairs, the distributing system is divided into six districts, four in the Borough of Manhattan and two in the Borough of The Bronx. As near as practicable to the centre of each district there is a repair shop and office, with telephone connection with the central office of the Department, the police stations, the fire-stations, and the general telephone systems. A repair company of mechanics and laborers, under the charge of a competent and experienced foreman, has charge of the repairs in each district, and men are stationed at the repair shops at all hours of the day and night to receive and attend to messages and reports of leaks or other accidents. One or two additional repair companies are also employed in making special repairs in the territory at large, as the occasion may require. The average repair force for 1898 included 51 mechanics, 133 laborers, 5 two-horse teams and 30 horses and carts.

The following are the prominent items of work done by this force during the year:

801 old fire-hydrants replaced by new ones.

5,783 fire-hydrants repaired.

| | |
|---|---|
| 29 | new stop-cocks placed. |
| 1,599 | stop-cocks repaired. |
| 1,172 | leaks in water-mains repaired. |
| 1,163 | leaking service-pipes cut off at the taps. |
| 3,711 | new taps placed in mains for house connections. |
| 970 | lineal feet of new mains laid. |

The unskillful or careless use of fire-hydrants by street cleaners and sprinklers causes much extra work and many complaints of leakage from hydrants which are not properly closed after using them.

### USE AND WASTE OF WATER.

During the year, the quantity of water daily distributed and consumed in the two boroughs was increased from 231,000,000 gallons, up to April, to 238,000,000 gallons in June, 251,000,000 gallons in August, and 256,000,000 gallons in September, after which it gradually diminished to 244,000,000 gallons in December. The average for the whole year was 243,000,000 gallons per day, which is 121 gallons per capita for a population of 2,000,000. It shows the enormous increase of 17,000,000 gallons in the total, and 9 gallons per capita over the daily consumption of water in 1897, and 98,000,000 gallons, 31 gallons per capita, over the consumption in 1890, when the New Aqueduct was first brought into use. Making the most liberal allowances for increase in population and buildings, and new demands on the water service by new contrivances, and methods for domestic, industrial and sanitary uses of the water, the conclusion is yet irresistible that enormous quantities are carelessly or wantonly wasted without any possible benefit in any direction. I believe it is safe to say that no other large municipality on the face of the globe uses and wastes its public and artificial water supply in such profusion, and that few, if any, of them have such quantities of supply at their disposal for use or waste. If such rate of increase should continue, all previous calculations and estimates as to the future necessities of the city, and the means of meeting them, would be set at naught; the magnificent resources of the combined water-sheds of the Croton, Bronx and Byram rivers will be exhausted or exceeded in a few years, and many more millions of dollars of public funds will, in a few years hence, have to be invested in obtaining water from new, more distant, more expensive and practically inexhaustible sources. The lesson to be drawn from this experience is the absolute necessity of effective measures to restrain waste, even at times when there is a superabundance of supply, because prolonged and unchecked indulgence in waste creates a fixed habit which cannot be overcome so long as the material for waste is at hand.

The water meter, and the enforced payment for water at meter rates have, so far, been the only practicable and effective means of detecting and checking waste. There are now 35,442 meters in use in Manhattan and The Bronx, covering, as I believe or am informed, every place where water is used to any considerable extent for other than domestic purposes. The presentation of meter bills for water consumed or wasted is such a forcible monitor that it is not reasonable to assume that any considerable portion of the people who receive and pay these bills will persist in wanton or careless waste of water. The bulk of the waste must, therefore, be in the dwellings, which are exempt from the use of meters and meter charges.

The consideration forces itself seriously on the municipal government and the public mind, whether the meter rates should not be enforced on dwellings as well as on business establishments.

The results of waste are most seriously felt in the high service districts and in the Borough of The Bronx, where the present means of supply are now used to their maximum capacity, and waste diminishes the pressures in the mains and the elevation at which the water can be delivered in the houses to the extent of depriving the higher grounds of an adequate supply. Waste reduces the pressures and elevation of delivery in any other part of the city as well, though to a lesser degree. As soon as a house-owner or tenant finds the force of water in his house diminished in the least, he lays the blame on the Department which has charge of the water supply, without giving a thought to the true causes.

In the Borough of The Bronx the supply is limited to the capacity of the Bronx and Byram watersheds, the resources of which are now strained to their full limit. The Department is preparing measures of relief by plans for the construction of a high service pumping station at Jerome Park, which will be fed from the Croton aqueducts, and for a large water-main from that station to the distributing mains in the easterly and southerly sections of the borough. The Department is prepared to proceed with the execution of these works, which have been approved by the Board of Public Improvements, as soon as they, and the issue of bonds to pay for them, are duly authorized by action of the Municipal Assembly and the Board of Estimate and Apportionment.

### HIGH SERVICE SUPPLY.

The following is the daily capacity of the present high service pumping plants :

| | Gallons. |
|---|---|
| High Bridge Station, built in 1871, and enlarged in 1888 | 6,000,000 |
| West Ninety-eighth Street Station, built in 1880 and enlarged in 1892 | 25,000,000 |
| West One Hundred and Seventy-ninth Street (Washington Bridge) Station, completed in 1896 | 28,000,000 |
| Total | 59,000,000 |

The high service districts include all the territory on Manhattan Island which is on a higher level than 65 feet above mean tide. It embraces the choicest residential parts of the city, such as Murray Hill, the surroundings of the Central Park, Morningside Heights and Washington Heights. The great development of this territory in buildings and population in the last twenty-eight years is in part shown by the following figures of the quantities of water pumped for the high service and supplied to the people, taken from the reports of the former Department of Public Works :

| | Gallons per day. |
|---|---|
| In 1871 to 1880 | 2,500,000 |
| " 1881 | 11,500,000 |
| " 1888 | 15,000,000 |
| " 1891 | 21,400,000 |
| " 1894 | 25,360,000 |
| " 1898 | 55,000,000 |

The present pumping plants are operated to their full capacity, with a reserve supply of 4,000,000 gallons in the High Bridge tower for emergencies. The area of vacant ground is still quite large, notwithstanding the vast progress in building in recent years. The rate of progress is not diminishing, but is increasing, and the demands on the high service are growing in proportion. To meet them, the Department has obtained the approval of the Board of Public Improvements to make a contract for two additional pumping engines for the Washington Bridge Station of 15,000,000 gallons daily capacity each, and the contract will be advertised for public letting as soon as the Municipal Assembly passes the requisite ordinance to authorize the work and expenditure. Application will also be made for authority and funds to lay a 36-inch main in the Boulevard, from Ninety-second street to Eighty-sixth street, and through that street and the Transverse road across Central Park, to increase the quantity and elevation of supply in the high service district east of the park, where the increase is very much needed.

### SUPPLY FROM PRIVATE WATER COMPANIES.

The large territory of the Borough of The Bronx which lies east of the Bronx river, and includes the former villages of Williamsbridge, Westchester and Wakefield, and part of the town of Pelham, receives its water from the New York and Westchester Water Company, under contracts made by the late town and village authorities which will not expire until 1905 unless they are terminated earlier by legal process or otherwise. The plant and service of this company are entirely inadequate, and the Department is constantly receiving complaints from people in that district of insufficient supply and pressure of water. In July, 1897, the late Commissioner of Public Works, at the solicitation of the company and delegations of property-owners and residents, verbally agreed to furnish 500,000 gallons of water per day from the Bronx conduit for distribution through the company's mains, at the charge of 1 cent per 100 gallons, and in December, 1897, the verbal agreement was confirmed and renewed by a written agreement. This supply by the city still continues, and without it the population of the district would suffer from a scarcity of supply which would practically be a water famine. It is highly desirable that the city extend its own water service to this territory as soon as possible, but at present there are obstacles to this, besides the existence of the franchises and contracts of the New York and Westchester Water Company. The city's system of distributing mains in the Borough of The Bronx has not yet reached the Bronx river, because the territory immediately west of the river is as yet undeveloped in respect to the establishment of regular and permanent street lines and grades. When these shall be established and some of the approaches to the river graded and extended across and beyond the river, and when the Jerome Park Reservoir shall be completed and a 48-inch main laid from it through Mosholu parkway, Bronx Park and the Southern Boulevard, all of which can be accomplished in two years, this Department will be prepared to extend its water service to the east of the Bronx river. The question will then present itself whether the city shall purchase the company's water-mains or lay its own mains.

The New York and Westchester Water Company's plant consists of a pumping station at Glen Hill, Yonkers, with one old pumping-engine, much in need of repairs; a pumping station at Pelham, with two pumping-engines in fair condition, but poorly housed; a standpipe at Glen Hill, 100 feet high and 21 feet diameter; a small reservoir at Glen Hill; 1.05 miles of 20-inch main from the Glen Hill station across the Bronx river to the upper portion of the district ; 45.86 miles of distributing mains, ranging in diameter from 4 inches to 16 inches ; 453 fire-hydrants, and 12 wells at Pelham 90 feet deep. The combined capacity of the two pumping stations is 2,500,000 gallons per day, but one of them is operated to less than half its capacity in consequence of its defective condition.

### TOTAL COST OF THE CROTON, BRONX AND BYRAM SYSTEMS

—beginning with the construction of the old Croton Aqueduct, 1837 to 1842 and continuing with all construction work under the Croton Aqueduct Department to April, 1870 ; the Department of Public Works to December 31, 1897 ; the Department of Water Supply during 1898, and the Aqueduct Commissioners from 1883 to December 31, 1898 :

| | |
|---|---|
| Old Croton Aqueduct, Bronx and Byram conduits, receiving and distributing reservoirs in the city | $16,731,845 88 |
| Removing masonry aqueduct, between Eighty-sixth and One Hundred and Thirty-fourth streets, and substituting iron pipes (1868 to 1873) | 4,905,402 12 |
| Storage reservoirs and dams | 5,160,204 46 |
| Distributing system, which now includes 833.41 miles of water-mains, 8,804 stop-cocks and 11,226 fire-hydrants | 18,957,643 14 |
| Sanitary protection, by acquisition of lands, extinguishment of mill rights, removal of nuisances, etc | 2,445,015 86 |
| New Aqueduct, reservoirs, lands, etc. (under the Aqueduct Commissioners) | 38,036,519 29 |
| Total | $86,236,630 75 |

---

## BOROUGH OF BROOKLYN.

A brief description of the Brooklyn water system, as it came under the charge of this Department on January 1, 1898, seems appropriate in this the first annual report of the Department. The data and material for this are almost entirely taken from the "History and Description of the Water Supply of the City of Brooklyn," compiled and written by Mr. I. M. De Varona, Engineer of Water Supply, under the direction of the Commissioner of City Works, and printed in 1897 in a large volume, with ample illustrations, statistical tables and plates or maps.

### SOURCES OF WATER SUPPLY.

With the exception of the pumping plants and wells at Gravesend and New Utrecht, which the City of Brooklyn acquired in 1895, and the plants of several private water companies, an account of which will be given below, the Borough of Brooklyn derives its entire water supply from a watershed within the boundaries of the County and the present Borough of Queens. This watershed embraces the southerly slope of the central ridge of Long Island, and the plains south of it to the salt meadows on the shores of Jamaica and Hempstead Bays. The area is 154 square miles. In addition to the public supply of Brooklyn, the water plants owned and operated by twelve private water companies and associations of property-owners in the Boroughs of Brooklyn and Queens derive their supply from this watershed.

The radical difference between the old New York and the Brooklyn water systems is in the topography of the watersheds and the intervening territory through which the water supply has to be conveyed to the distributing systems. The entire New York supply flows by gravity or decline of grade from the elevations of the sources to and through the distributing mains. The only pumping required is for the high service supply within the city.

The gravity supply in the Brooklyn system is confined to the flow from streams and supply ponds in the easterly section of the watershed, east of Millburn Station, which is 15 miles east of the Ridgewood Reservoir, and from some streams, reservoirs and ponds west of Milburn. A very large percentage of the supply is pumped into the conduits from wells and from bodies of water below the level of the conduits. At Ridgewood pumping station, which is the westerly terminus of the conduit lines, the entire supply has to be pumped a height of 170 feet into the Ridgewood Reservoir. The supply distributed from the Mount Prospect Reservoir for the higher ground of the borough is again raised 50 feet or more, by pumping, and the supply from the Mount Prospect tower is pumped for the third time a height of 80 feet or more, for delivery to the highest elevations in the borough.

The annual rainfall in the watershed since 1826 averaged 43.43 inches. For the year 1898 it was 51.22 inches, taken by a rain-gauge at the Hempstead Reservoir.

### RESERVOIR AND PONDS.

The Brooklyn water system includes the following ponds and reservoirs for the storage of water, given in the chronological order of their acquisition and construction, and nearly in the order of their distance from the city line to the easterly boundary of the watershed, with the area and available storage capacity of each :

Smith's Pond—Acquired in 1853 ; area of water surface, 27.25 acres ; capacity, 41,580,000 gallons.

Baisley's Pond—Acquired and dam built in 1858 ; area of water surface, 40 acres ; capacity, 41,940,000 gallons.

Pine's Pond—Acquired and dam built in 1859 ; area of water surface, 8 acres ; capacity, 9,046,000 gallons.

Simonson's Pond—Acquired and dam built in 1862; area of water surface, 8.75 acres; capacity, 9,870,000 gallons.

Clear Stream Pond—Acquired and dam built in 1862 ; area of water surface, 1.07 acres ; capacity, 977,500 gallons.

Valley Stream Pond—Acquired and dam built in 1862 ; area of water surface, 17.78 acres ; capacity, 20,850,000 gallons.

Hempstead Pond—Acquired and dam built in 1862 ; improved in 1879 and 1894 ; area of water surface, 23.52 acres ; capacity, 26,900,000 gallons.

Hempstead Reservoir—Construction begun in 1872, completed in 1877, and first filled in 1879 ; area of water surface, 237.6 acres ; capacity, 1,000,000,000 gallons. Work is still in progress, under a contract made by the late Commissioner of City Works, on March 20, 1897, for diverting the water of Hempstead stream, at an estimated cost of $100,000, on which certificates for payments to the amount of $61,639.78 were made in 1898.

Watt's Pond—Acquired and dam built in 1880; improved in 1882 and 1893; area of water surface, 3.83 acres; capacity, 3,750,000 gallons.

Springfield Pond—Acquired and dam built in 1881; area of water surface, 7.34 acres; capacity, 7,199,000 gallons.

Millburn Pond—Acquired and dam built in 1892; area of water surface 13.63 acres; capacity, 11,100,000 gallons.

East Meadow Pond—Acquired and dam built in 1892; area of water surface 16.15 acres; capacity, 18,830,000 gallons.

Newbridge Pond—Acquired and dam built in 1892; area of water surface 8.9 acres; capacity, 11,428,000 gallons.

Wantagh Ponds—Acquired and dam built in 1892; area of water surface 24.92 acres; capacity, 44,020,000 gallons.

Massapequa Lake—Acquired and dam built in 1891–2; area of water surface 14.55 acres; capacity, 16,990,000 gallons.

Massapequa Pond—Acquired and dam built in 1892; area of water surface 38.56 acres; capacity, 19,000,000 gallons.

Millburn Reservoir—Construction begun in 1890, and reported as practically completed in 1894, but never accepted from the contractor, owing to subsequent leakage through the bottom and sides at the rate of six per cent. of the contents in every 24 hours. When filled, the area of the water surface will be 48 acres, and the capacity, 373,000,000 gallons.

Exclusive of the unaccepted Millburn Reservoir, the aggregate area of all the storage ponds and reservoirs is 491.45 acres, and the available storage capacity 1,283,480,500 gallons.

### DRIVEN WELL STATIONS.

From time to time, beginning in 1882, it became necessary to add to the water supply by the construction and operation of driven wells, of which the following is a brief account and description:

Spring Creek Station—There are practically two stations, completed in 1883, distinguished as the old and the new, each having 100 wells, converging into one central reservoir which is connected by the suction-pipe with the pumps. The maximum yield of the two stations is 8,460,000 gallons for 24 hours. There is also what is called a temporary station, built in 1894 in the emergency of a severe drought, and consisting of 13 6-inch wells, which give an average yield of 4,569,000 gallons in 24 hours.

Baisley's Station—With 100 2-inch wells, giving an average daily yield of 2,000,000 gallons.

Jameco Station—Built in 1888, with 183 shallow and 7 deep wells, to which were added in 1895, 10 8-inch and 1 10-inch deep wells; average daily yield, 3,000,000 gallons.

Forest Stream Station—Completed in 1885; 110 2-inch wells; average daily yield, 3,500,000 gallons.

Clear Stream Station—Completed in 1885, 150 wells of an average depth of 53 feet; average daily yield, 3,500,000 gallons.

Watt's Pond Station—Twelve 6-inch wells, completed in 1894; average depth, 50 feet; daily yield, 2,500,000 gallons.

Agawan Station—Thirty-two 6-inch wells, completed in 1896; average daily yield, 3,600,000 gallons; average depth of wells, 91 feet.

Merrick Station—Sixty-two 4½-inch wells, completed in 1896; average depth, 60 feet; average daily yield, 4,100,000 gallons.

Matowa Station—Forty-six 4½-inch wells, completed in 1896; average depth, 36 feet and 97 feet; average daily yield, 4,000,000.

Wantagh Station—Forty-three 4½-inch and 6 6-inch wells, completed in 1896; average depth of 6-inch wells, 92 feet, and of 4½-inch wells, 89 feet and 24 feet; average daily yield, 3,700,000 gallons.

Massapequa Station—Fifty-three 4½-inch wells, completed in 1896; ten of the wells 106 feet depth, the others 37½ feet depth; average daily yield 5,000,000 gallons.

New Spring Creek Station—One 6-inch and seven 8-inch wells, completed in 1896; depth from 149 to 157 feet; average daily yield 2,000,000 gallons.

Shetucket Station—Twelve 8-inch wells, completed in 1897; average depth 180 feet; average daily yield 3,500,000 gallons.

Oconee Station—Twelve 8-inch wells, completed in 1897; average depth 195 feet; average daily yield 2,500,000 gallons.

New Jameco Station—Twelve 8-inch wells, completed in 1897; depth from 152 to 180 feet; average daily yield 4,000,000 gallons.

Springfield Station—Twenty 8-inch wells, completed in 1897; depth from 55 to 207 feet; average daily yield 2,500,000 gallons.

### CONDUIT LINES.

A brick conduit, 7½ miles long, collects and conveys the water from the easterly section of the water-shed, beginning at Massapequa pond and emptying into the pump well at Millburn pumping station. The bottom is inverted and the top is arched. The interior dimensions are: Commencing at Massapequa Pond, width at spring line 7 feet 4 inches, height 5 feet 11 inches; this is gradually enlarged to 9 feet 4 inches in width and 6 feet 11 inches in height at Millburn, the point of discharge.

A brick conduit 12 miles long, from Hempstead Pond to the pump well at Ridgewood station, collects and conveys the water from the westerly section of the water-shed, and also receives part of the supply from the easterly section through the pump well, pumping plant and force-mains at Millburn. The shape of the conduit is the same as that east of Millburn; at Hempstead Pond the interior width is 9 feet 4 inches; height 6 feet 11 inches, gradually enlarged to 10 feet in width and 8 feet 8 inches in height at the point of discharge, Ridgewood station.

The estimated safe capacity of flow of water for which these conduits were designed and built is as follows:

| | Gallons. |
|---|---|
| At Massapequa Pond | 40,617,000 |
| At Wantagh Ponds | 46,841,000 |
| At Simonson's Pond | 50,500,000 |
| At Jamaica | 62,000,000 |
| From Baisley's to Ridgewood | 75,000,000 |

A 48-inch iron pipe conduit, fifteen miles long, conveys water from the Millburn engine house to the Ridgewood engine house. It is laid parallel with and near to the brick conduit, and was completed in 1896.

As early as 1884 the consumption of water had reached the maximum safe capacity of the brick conduit, and since that time it has been subjected to a constantly increasing strain to meet the increased demands on the water service created by the increase in population, buildings, industries and commerce. The strain has now reached a dangerous point, and the safety of the brick conduit demands the construction of an additional conduit of large capacity in the shortest time possible.

Several years ago the engineers in charge of the Brooklyn water system prepared plans and reported in favor of a 66-inch steel conduit from Millburn to Spring Creek, near Ridgewood. The authority for this work was obtained, and on August 7, 1896, the contract to build this conduit was awarded to Mr. John McNamara at the sum of $850,000. The Comptroller of the City of Brooklyn did not attach his certificate, required by the provisions of the Brooklyn Charter, that sufficient funds were available to cover the contract and no work has been performed under it. The present Corporation Counsel, Hon. John Whalen, rendered an opinion in other identical cases that, without the Comptroller's certificate, a contract is not valid and not binding on the city, but that the contractor might test his right under the contract in the courts.

By a communication dated December 29 I brought these conditions, and the growing urgency for the construction of the steel pipe conduit, to the attention of the Board of Public Improvements, and asked for the authorization of that Board and of the Municipal Assembly to advertise, award and execute a new contract, and for the requisite bond issue to pay for the work.

### RECEIVING AND DISTRIBUTING RESERVOIRS.

The Ridgewood Reservoir has three storage basins of an aggregate capacity of 304,000,000 gallons. The first two basins, 150,000,000 gallons capacity, were built under a contract made in 1856, and water was first admitted in November, 1858. The third basin, 154,000,000 gallons capacity, was built under a contract made in 1889 and completed in August, 1891. The elevation of the water service at high water is 150 feet above tide.

The Mount Prospect Reservoir was also built under a contract made in 1856, on land originally laid out for the park designated as Mount Prospect Square. Its capacity is 19,185,000 gallons, and the elevation of water service is 198½ feet above tide—48½ feet higher than the Ridgewood Reservoir. It is fed from the latter reservoir by pumping engines in the Mount Prospect engine house. From this higher elevations about 4,500,000 gallons of water per day is distributed to the high grounds in the Borough of Brooklyn. In 1890 a stand-pipe or tower was added to this station to supply the extreme elevation in the borough. Its diameter is 16 feet, elevation at top of overflow 278.4 feet, and capacity 111,500 gallons. The average daily supply now distributed from it is 2,820,000 gallons.

### PUMPING ENGINES.

At the close of 1895, the following engines were in use :

| STATIONS. | NUMBER OF ENGINES. | DAILY CAPACITY OF EACH ENGINE. | TOTAL DAILY CAPACITY. |
|---|---|---|---|
| | | Gallons. | Gallons. |
| Ridgewood | 3 | 15,000,000 | 45,000,000 |
| “ | 2 | 7,500,000 | 15,000,000 |
| “ | 5 | 10,000,000 | 50,000,000 |
| Mt. Prospect | 1 | 5,000,000 | 5,000,000 |
| “ | 1 | 4,000,000 | 4,000,000 |
| “ | 2 | 1,250,000 | 2,500,000 |
| Spring Creek | 2 | 3,000,000 | 6,000,000 |
| Baisley's | 2 | 3,000,000 | 6,000,000 |
| Jameco | 1 | 5,000,000 | 5,000,000 |
| “ | 2 | 6,000,000 | 12,000,000 |
| Springfield | 1 | 5,000,000 | 5,000,000 |
| Forest Stream | 2 | 5,000,000 | 10,000,000 |
| Clear Stream | 2 | 5,000,000 | 10,000,000 |
| Watt's Pond | 1 | 3,000,000 | 3,000,000 |
| Smith's Pond | 2 | 5,000,000 | 10,000,000 |
| Millburn | 1 | 4,000,000 | 4,000,000 |
| “ | 5 | 10,000,000 | 50,000,000 |
| Gravesend | 1 | 5,000,000 | 5,000,000 |
| “ | 1 | 2,000,000 | 2,000,000 |
| New Utrecht | 2 | 2,000,000 | 4,000,000 |
| *Added Since* 1895. | | | |
| At driven well stations | 6 | .......... | 23,000,000 |
| At Ridgewood. | 2 | 25,000,000 | 50,000,000 |
| Totals | 47 | .......... | 336,500,000 |
| Discontinued | 3 | .......... | 19,000,000 |

Now in use, 44 engines ; aggregate daily capacity, 327,500,000 gallons.

### DISTRIBUTING SYSTEM.

On January 1, 1898, the system embraced the following distributing-mains, water-gates or stopcocks, and fire-hydrants, including the Gravesend and New Utrecht systems :

| | | |
|---|---|---|
| 48-inch mains | 99,970 feet = | 18.934 miles. |
| 36 " | 54,616 " = | 10.344 " |
| 30 " | 49,869 " = | 9.445 " |
| 20 " | 137,064 " = | 25.959 " |
| 16 " | 35,710 " = | 6.763 " |
| 14 " | 3,159 " = | 0.598 " |
| 12 " | 286,115 " = | 54.183 " |
| 10 " | 19,601 " = | 3.712 " |
| 8 " | 599,895 " = | 113.617 " |
| 6 " | 1,714,004 " = | 324.622 " |
| 4 " | 53,305 " = | 10.096 " |
| Total length of mains | | 578.278 miles. |

| | |
|---|---|
| 48-inch stopcocks | 17 |
| 36 " | 17 |
| 30 " | 29 |
| 20 " | 180 |
| 16 " | 9 |
| 14 " | 1 |
| 12 " | 441 |
| 10 " | 7 |
| 8 " | 974 |
| 6 " | 3,027 |
| 4 " | 78 |
| Totol stopcocks | 4,780 |
| Total fire-hydrants | 6,144 |

### GRAVESEND WATER PLANT.

This plant consists of an engine-house, the upper part of which is occupied as a dwelling for the engineer; a boiler-house, two pumping engines of 3,000,000 gallons daily capacity, 113 two-inch driven wells, from which the water supply is obtained, and 17 miles of distributing-mains, ranging in diameter from 4 inches to 16 inches. The plant supplies the territory of the former Town of Gravesend, now the Thirty-first Ward of the Borough of Brooklyn, and was bought by the City of Brooklyn from the Sewer Commissioners of Gravesend in 1895, for the sum of $423,000, the actual value, according to testimony given before the Commissioners of Appraisal, being $125,000. The payment of $423,coo was compulsory under the Act of 1895, which authorized the purchase for an amount not less than half the amount of bonds issued by the Town of Gravesend for the construction of the plant. The average daily supply distributed from the plant is 2,064,600 gallons, but varies from 1,500,000 gallons in winter to over 3,oco,oco gallons in the height of summer.

### NEW UTRECHT WATER PLANT.

This supplies most of the territory of the former Town of New Utrecht, now the Thirtieth Ward of the Borough of Brooklyn. At the time of the annexation of New Utrecht to the City of Brooklyn, in 1894, the plant was owned by the Kings County Water Company, from which the City of Brooklyn purchased it in 1895 for the sum of $205,855. It consists of a building containing the engine-room, boiler-room and offices; two pumping engines of 2,000,000 gallons daily capacity each; a system of open and driven wells from which the supply is pumped, and 24 miles of distributing mains. The average daily supply distributed from the station is 1,454,000 gallons, and varies between 925,000 gallons in winter and 2,500,000 gallons in the height of summer.

### LABORATORY.

In 1896 a laboratory for chemical analyses and biological examinations of the water obtained from the different sources was established at the Mount Prospect Station, and properly equipped. Samples of water from all parts of the water system are scientifically analyzed and tested every day by a Biologist, a Chemist and an Assistant Chemist, and since January 1, 1898, these tests include water from the supplies in the boroughs of Queens, Manhattan and The Bronx. They have proved very useful in giving warnings of contaminations, thus aiding to preserve the purity of the water supply.

### PRIVATE WATER COMPANIES AND PLANTS.

The Long Island Water Company was incorporated in 1873, for fifty years, and in September, 1881, received a franchise for 25 years to supply the Town of New Lots with water. This town was annexed to the City of Brooklyn in 1886, and now constitutes the Twenty-sixth Ward of the borough. The water plant was built in 1881, and now consists of three pumping-engines of an aggregate daily capacity of 6,560,000 gallons; four boilers, with a total of 325-horse power; 2 miles of 16-inch force-mains; a reservoir of 5,000,000 gallons capacity near the Highland Boulevard, two miles from the pumping plant; 22 2-inch and 5 6-inch driven wells as sources of supply, and 47 miles of 6-inch, 8-inch and 12-inch distributing mains, with 673 fire-hydrants. The average daily supply pumped and distributed to an estimated population of 50,000 is 4,500,000 gallons. Under a still-existing contract, made by the City of Brooklyn prior to 1898, the company is paid $31,145 per year for the rentals of 669 hydrants, being an average of $46.55 per hydrant.

The Flatbush Water Company was incorporated in 1881 for fifty years, and received permission from the Town of Flatbush, not in the form of a franchise, to lay water-pipes, etc. The Act of 1894, making the Town of Flatbush the Twenty-ninth Ward of the City of Brooklyn, prohibits the city from laying water-mains and supplying water in that territory until the expiration of the company's charter, and authorized the making of a contract for fire-hydrant service. The plant includes three pumping-engines of 11,000,000 gallons aggregate daily capacity; three boilers of 80-horse power; a standpipe, 20 feet diameter, 103 feet high, and 239,700 gallons capacity; 66½ miles of distributing mains, ranging in diameter from 4 inches to 20 inches, with 535 stop-cocks and 609 fire-hydrants; 12 open 8-inch wells and 10 deep 4-inch wells for sources of supply. The average daily supply pumped and distributed is 5,000,000 gallons. Under a contract made by the City of Brooklyn prior to 1898, the company receives $30,000 per year for fire-hydrant service.

The West Brooklyn Water Company supplies a small territory in West Brooklyn, bounded by Forty-first street, New Utrecht and Fort Hamilton avenues, Fifty-seventh street and Fifteenth avenue. The main pumping plant is on Forty-second street, near Fort Hamilton avenue. The plant includes one steam pumping-engine of 216,000 gallons daily capacity ; one hot-air engine of 2,000 gallons daily capacity ; one 15-horse-power boiler; 15.7 miles of 2½-inch, 4-inch, 6-inch and 8-inch distributing mains, with 47 stop-cocks and 35 fire-hydrants ; 3 tanks of 42,000 gallons capacity ; one 6-inch open brick well, and one 6-inch driven well as sources of supply. The average daily supply distributed through the mains is 210,000 gallons.

The Blythebourne Water Company, whose plant and territory are in the same section of the borough as that of the West Brooklyn Water Company, has two steam-pumps of 216,000 and 115,000 gallons daily capacity ; two hot-air pumps, each of 2,500 gallons capacity per hour, but seldom used : two steam-boilers of 50 and 30 horse power ; 12.4 miles of distributing pipes of 2 to 8 inches diameter, with 47 stop-cocks and 14 fire-hydrants ; two tanks of 20,000 and 25,000 gallons capacity ; one 5-inch open brick well, and two driven wells of 7 and 8 inches diameter, respectively. The average daily supply distributed is estimated at 250,oco gallons.

There are four associations and estates which own small private plants, located in thinly populated sections of the borough : The German-American Improvement Company, 8.4 miles of 6-inch mains ; the Germania Real Estate Company, 13.3 miles of 4 and 6 inch mains ; the W. P. Rae Real Estate Company, 1.6 miles of 2 and 4 inch mains ; and the H. C. P. Rae Estate, 1.5 miles of 1¼, 2 and 4 inch mains. Each of these includes a small pumping plant and wells, except that of the Germania Real Estate Company, which is supplied with water by the Flatbush Water Company, and three-eighths of the German-American Improvement Company's distributing system, which is supplied with water by the Long Island Water Company. The total daily supply distributed through the four plants does not exceed 450,000 gallons. The total daily supply distributed by private water companies and private water plants in the borough is estimated at 10,400,000 gallons.

## OPERATIONS AND WORK IN THE BOROUGH OF BROOKLYN FOR 1898.

On January 1, 1898, there were no available funds from bond issues of the City of Brooklyn, applicable to new works for the extension and improvement of the watershed, reservoirs, ponds, wells, pumping plants and conduit lines, and for laying additional water-mains to extend the water service. Early in the year the Corporation Counsel advised that the moneys collected from water revenue, after providing for interest on the outstanding water debt and the sinking fund for the redemption of the debt, are applicable to the cost of labor, services and materials required for the maintenance and repairs of the entire water system, but not to the extension and improvement of the system for collecting the supply and conveying it to the city, or for the extension of the water service by distributing mains into new streets and territory ; and that the administrative expenses for salaries and contingencies must be provided for in the annual estimates and appropriations raised by general taxation in each year's tax levy.

No bond issues were authorized or made during the year, consequently no new work for the further development and extension of the water system has been or could be undertaken. Progress has, however, been made on four contracts which were made and provided for prior to January 1, 1898, and not completed at that date.

### WORK ON UNFINISHED CONTRACTS.

Contract of Henry R. Worthington, dated November 20, 1895, for three new pumping-engines of 20,000,000 gallons daily capacity each, in place of three old ones, one of 10,000,000 and two of 7,500,000 gallons capacity; estimated and certified cost, $390,000; amount paid prior to January 1, 1898, $212,000; amount paid in 1898, $4,400. Two of the new engines were completed prior to 1898, and have since been in constant operation. Progress on the third engine has been slow, in consequence of the necessity of operating the old engine No. 2, which occupied the space for the new one during part of the year. The foundations were completed early last December, when the erection of the engine was begun, and has so far progressed satisfactorily.

Contract of M. T. Davidson, dated August 31, 1897, for a pumping-engine at Mount Prospect Station of 3,000,000 gallons daily capacity; estimated and certified cost, $9,500; amount paid to January 1, 1898, $6,090; amount paid in 1898, $2,460; ten per cent. retained during period of probation. This engine was completed in the first quarter of 1898, and has since been in constant operation. It has shown an excess of capacity over the contract requirements for which the contract provided a premium.

Contract of Charles Hart, dated March 20, 1897, for diverting Hempstead stream; estimated and certified cost, $100,000; nothing paid prior to January 1, 1898; amount paid in 1898, $61,639.78. This work is for the purpose of diverting the polluted portion of Hempstead stream from the supply which passes into the conduit, and consists mainly of laying a 36-inch pipe line, 14,400 feet long, from the head of Hempstead reservoir to the lower end of Smith's pond. It was begun late in 1897, and was rapidly progressed during the first six months of 1898, when 9,907 feet of the pipe-line had been laid, and the ditch for the diversion of the polluted water, the dams and grading for the settling basin, and much of the masonry work were completed. Soon thereafter the work reached a stage when it had to be suspended until the depth of water in the reservoir could be lowered, as required by the terms of the contract. This was not accomplished until December 13, as the water had to be drawn off slowly in order to utilize it for supply in the city. The work was then resumed, and at the close of the year about 3,950 feet of the pipe-line remained to be laid.

Contract of M. J. Dady, dated July 19, 1897, for constructing a by-pass around Ridgewood reservoir; estimated and certified cost, $65,000; amount paid to January 1, 1898, $38,390.04; amount paid in 1898, $14,473.96. This work was completed in June last. It consists of a 60-inch steel pipe-line around the reservoir, connections with the force-mains from the Ridgewood pumping station, construction of chambers for large water meters and meter registers of the Venture pattern, and some grading and concrete work on the reservoir embankment.

## MAINTENANCE AND REPAIRS.

All expenditure on this account is paid from the water revenue. It includes:

First—The operation and repairs of the pumping plants at twenty-two stations with 44 pumping-engines of 327,500,000 aggregate daily capacity. The present force employed is: 92 Enginemen, 46 Firemen, 5 Machinists, 32 Oilers and 29 Stokers and Coal Passers. The greater part of the pumping plant is operated night and day, requiring three reliefs of crews.

Second—The care and repairs of conduit lines, reservoirs, ponds and all buildings, dams, culverts, other structures and grounds in the watershed, along the conduit lines, and the work done to protect the water supply from pollution by patrolling the borders of the streams, ponds and reservoirs, and maintaining systems of dry-pan closets in villages and hamlets near the sources of supply to neutralize and dispose of excrement and sewage. The following is the present force employed on this work: 1 Superintendent and Assistant, 6 Keepers, 1 Civil Engineer and 3 Assistants, 4 Inspectors, 20 Mechanics, 14 Well Drivers and 164 Laborers.

Third—The maintenance and repairs of 578 miles of distributing mains, 4,780 stop-cocks or water-gates, 6,144 fire-hydrants and a large number of drinking hydrants or fountains. The force now employed consists of 3 Foremen, 31 Mechanics and 105 Laborers.

The details of the maintenance and repair work for the year are too numerous to be embodied in this report, but will be found in the report of the Chief Engineer, which is hereto appended. It is proper, however, to make special mention of the only serious accident which happened to the distributing system during the year.

The accident was a break in a 48-inch water-main, which occurred at Central avenue and Covert street, between 4 and 5 o'clock on the morning of December 11. The volume of water discharged through the break was very large, flooding streets, cellars and basements for a radius of about 150 feet, and doing considerable damage to buildings, car-tracks and the Central avenue sewer. For a brief time it cut off the water supply to the Mount Prospect pumping station and affected the supply in some other sections of the borough; but a Department repair force arrived within an hour after the accident, and by closing certain water gates and opening others, promptly stopped further flow through the break, and restored the circulation and supply through the distributing system. The quantities of pavement, earth and other material carried away by the flood, the debris to be removed and the damage to the sewers to be repaired were too large to be handled with the necessary expedition by the Department repair force. In the emergency a firm of contractors with a large working force was at once employed to prosecute the repairs night and day, to prevent damage claims as far as possible. Several Department Inspectors were also detailed to make prompt examinations and estimates of damage done to private property, in order to forestall and obtain evidence against excessive damage claims and suits. The repairs to the water-mains were completed by the Department force on the afternoon of December 14, and the other repairs were finished by the contractors' men shortly after that, at a total cost of $7,147.93.

## ANALYSES OF WATER SUPPLY.

At the Department Laboratory 2,180 samples of water were received, of which a considerable number were from the supply in the Borough of Queens, and some from the Croton, Bronx and

Byram systems. The work of the Laboratory staff in testing the samples included 1,874 physical examinations, 1,688 chemical analyses, 1,825 microscopical examinations, 2,204 bacteriological examinations and 283 chlorine determinations of water in driven wells.

Samples of coal and oils submitted by bidders for contracts were also tested and analyzed.

## CONSUMPTION OF WATER.

The following shows the average daily supply and consumption of water for each month of the past year :

| MONTH. | RIDGEWOOD RESERVOIR, LOW SERVICE. | MT. PROSPECT RESERVOIR, MEDIUM HIGH SERVICE. | MT. PROSPECT TOWER, EXTREME HIGH SERVICE. | TOTAL RIDGEWOOD SYSTEM. | GRAVESEND SYSTEM. | NEW UTRECHT SYSTEM. | TOTAL PUBLIC SUPPLY. |
|---|---|---|---|---|---|---|---|
| | Gallons. | Gallons. | Gallons. | Gallons. | Gallons. | Gallons. | Gallons. |
| January | 83,162,901 | 4,640,555 | 2,311,435 | 90,114,891 | 1,644,339 | 988,742 | 92,747,972 |
| February | 83,950,258 | 4,614,592 | 2,255,071 | 90,819,921 | 1,649,750 | 942,979 | 93,412,650 |
| March | 81,531,289 | 4,336,329 | 2,354,484 | 88,222,102 | 1,504,926 | 993,539 | 90,720,567 |
| April | 80,064,813 | 4,355,521 | 2,385,826 | 86,806,160 | 1,618,130 | 1,241,680 | 89,665,970 |
| May | 80,777,523 | 4,343,512 | 2,600,255 | 87,721,290 | 1,736,174 | 1,263,935 | 90,721,399 |
| June | 84,458,626 | 4,605,403 | 2,734,433 | 91,798,462 | 3,071,113 | 1,757,953 | 96,627,528 |
| July | 83,363,462 | 4,531,770 | 2,777,236 | 90,672,468 | 2,644,906 | 2,073,097 | 95,390,471 |
| August | 83,935,027 | 4,586,766 | 2,789,968 | 91,311,761 | 2,890,271 | 2,348,668 | 96,550,700 |
| September | 86,245,146 | 4,782,090 | 2,893,916 | 93,921,152 | 2,765,403 | 2,277,477 | 98,964,032 |
| October | 83,262,982 | 4,431,452 | 2,862,064 | 90,556,498 | 2,083,490 | 1,629,858 | 94,269,846 |
| November | 80,728,294 | 4,232,301 | 2,820,800 | 87,781,395 | 1,563,457 | 924,937 | 90,269,789 |
| December | 83,628,758 | 4,331,020 | 2,817,710 | 90,777,488 | 1,587,774 | 942,961 | 93,308,223 |
| Average for the year | 82,937,213 | 4,481,402 | 2,635,888 | 90,054,503 | 2,064,615 | 1,454,382 | 93,573,500 |

The foregoing table shows that the people in the Borough of Brooklyn indulge in profuse use of water, or waste, in hot summer days to keep cool, and in midwinter to prevent freezing in their service pipes, as people do in other cities. The degree of profusion or waste is, however, much smaller than in the boroughs of Manhattan and The Bronx. This is undoubtedly due more to the fact that the present Brooklyn water system is not capable of supplying the percentage of profusion or waste which is supplied and used from the Croton, Bronx and Byram systems, than to a disposition to exercise greater care and restraint in the use of the public water supply. If Brooklyn had the same abundance of supply which Manhattan has enjoyed in the last eight years, the people would, probably, fall into the same habits of waste. In the Ridgewood water system the difference between the minimum daily consumption in mild weather, and the maximum in the hottest month was over 7,000,000 gallons, or $7\frac{7}{10}$ per cent. of the average for the year. In Manhattan it was 28,000,000 gallons, or $11\frac{4}{10}$ per cent. of the average for the year.

To the average daily Brooklyn supply of 93,573,500 gallons for the year 1898, from the public water plants, is to be added 10,500,000 gallons from private plants, making a total of 104,073,500 gallons, for a population of 1,179,100, given by the census of the Health Department of last July.

This is at the rate of $88\frac{3}{10}$ gallons per capita, which is very liberal and ample for all purposes of comfort, health and safety, though the per capita rate in Manhattan and The Bronx for 1898, was 121 gallons. Until the Brooklyn supply can be increased by the construction of an additional conduit and other improvements, which, under the most favorable conditions, will consume at least two years' time, the per capita rate of consumption must of necessity be diminished, because the population and the number of consumers will grow, even if no extensions of the distributing system are made. Measures to restrain waste are, therefore, indispensable to an equitable distribution of the supply to all consumers. The water meter, which is the only effective check on waste so far known by practical application, has hitherto been used in Brooklyn only to a very limited extent. There are now only 2,705 meters in use, while the number in the boroughs of Manhattan and The Bronx, is 35,442. The necessity for further extension of the meter system seems unavoidable, in whatever light the situation may be considered.

## PRESENT AND FUTURE NECESSITIES FOR DEVELOPMENT AND EXTENSION OF THE BROOKLYN WATER SYSTEM.

The urgency of measures to increase the water supply by the further development and utilization of the resources of the present watershed, and ultimate acquisition of additional watershed, and sources of supply, and for large extensions of the distributing mains into the large territory which has been annexed to the city and present borough in the past ten years, became forcibly apparent to me soon after my accession to the office of Commissioner of Water Supply.

In preceding paragraphs of this report I have already presented the reasons for the immediate need of enlarging the conduit capacity, from the watershed to the distributing system, by the construction of a large steel pipe conduit, for the double purpose of relieving the dangerous strain on the present brick conduit and increasing the conduit capacity, and I have also shown the necessity of increasing the quantity of water supplied and distributed through the mains.

On the subject of extending the water service by additional mains, I received many petitions from the very beginning of this administration, principally from property-owners and residents in newly annexed territory. The necessity of making the stereotyped reply that my hands were tied by the total absence of available funds, and by the barriers to new bond issues, was not comforting either to the petitioners or myself. However, I responded to the petitions, and to reports made by the Chief Engineer of this Department, by submitting to the Board of Public Improvements for approval and for presentation to the Municipal Assembly six separate communication or reports, between the dates of March 29 and December 5, calling for the laying of 104,755 feet, or nearly 20 miles, of additional water-mains in the Borough of Brooklyn, at an estimated expense of $128,850. The Board acted favorably on all these reports, but the Municipal Assembly deferred its action until the close of the year, when ordinances were passed, and were approved by your Honor, covering 101,500 feet of the additional mains. A contract for these mains will be advertised and let at an early day.

Delay in meeting the demands for increase of supply of water and for extension of the service prevents the development of new and vacant territory by private enterprise and investment, and prevents additions to the taxable values of property. On the other hand judicious progress in quantity of supply and extension of the service will meet and encourage private enterprise, will add to the taxable values, will speedily and largely increase the revenue from the water service and will thereby create funds for the support of the bond issue for further improvements without resort to additional taxation, and will, on the contrary, become an important factor in lessening taxation by lowering the tax rate.

As to quantity of supply, the present watershed is capable of further development and considerable increase of obtainable supply by sinking additional wells at each or most of the pumping-stations and by corresponding increase in the capacity of the pumping machinery. A proper enlargement of pumping plant at Millburn Station to the capacity of the brick conduit which brings to that station the yield of the easterly section of the watershed, would alone add over 20,000,000 gallons per day to the present supply, if the conduit capacity west of Millburn is enlarged at the same time. By these and other means the necessity for acquiring additional watershed and sources can be put off for a few years.

In a communication to the Board of Estimate and Apportionment in October last, I summarized the immediate necessities for improvements and extensions, and for corresponding bond issues, as follows:

| | |
|---|---|
| For 66-inch steel conduit from Spring Creek to Millburn | $950,000 00 |
| For improvement and increase of Millburn Pumping-station and Plant | 100,000 00 |
| For laying additional distributing mains | 150,000 00 |
| For lands to increase well pumping plants and for protection of water from pollution at the sources | 150,000 00 |
| For additional wells, machinery, engine-houses, etc., at well pumping plants. | 150,000 00 |
| Total | $1,500,000 00 |

I herewith renew the recommendation for the speedy authorization of these improvements and the necessary bond issues.

The following is the total amount expended for the construction of the Brooklyn water system from its inception to December 31, 1898 :

| | |
|---|---|
| For lands, water rights, reservoirs, ponds, wells, conduit lines and pumping plants. | $15,011,249 76 |
| For distributing mains, stop-cocks and hydrants | 9,400,000 00 |
| Total | $24,411,249 76 |

## BOROUGH OF QUEENS.

Of the territory of this borough, the former Long Island City and the former Villages of Flushing, College Point and Whitestone had public water plants, which became the property of the city on January 1, 1898. All the other territory which is artificially supplied with water obtains the supply from private water companies.

### LONG ISLAND CITY WATER SYSTEM.

There are three pumping stations supplied from wells. The wells for Station No. 2 are so near the shore of Flushing Bay that the water obtained from them is too brackish to be used for drinking or cooking, and no water has been taken from them during the past year. The obtainable daily supply of proper quality from the three plants at no time exceeds 2,000,000 gallons, and is frequently several hundred thousand gallons less. It is distributed through 23.19 miles of water-mains, ranging in diameter from 4 inches to 14 inches, with 91 stop-cocks and 67 fire hydrants.

When the system came under the charge of this Department, it was thoroughly examined by our Chief Engineer. The entire plant, including wells, machinery, buildings, distributing mains, stop-cocks and hydrants, was found to be in poor and neglected condition, and the capacity of the supply was found to be utterly inadequate. The circulation of the water was stopped by numerous dead ends in the distributing mains. A considerable part of the population had to cart its water supply from other and distant sources. Two of the pumping plants were old and worn, and the third had but one engine and boiler, housed in temporary wooden buildings.

In a communication dated February 14, I presented these facts to the Board of Public Improvements, with the following estimate of the character, quantities and cost of the works of immediate necessity to put the water system in fairly efficient condition :

| | |
|---|---|
| Furnishing and laying 8,000 feet of 20-inch, 18,000 feet of 12-inch, and 8,000 feet of 6-inch mains, with stop-cocks and hydrants | $62,000 00 |
| Driving two 2-inch test wells and twenty permanent and deep 6-inch wells, with connections to the pumping plant | 15,200 00 |
| Total | $77,200 00 |

The Board approved and authorized these works, but the necessary authorization by the Municipal Assembly, including bond issue to cover the cost, was not obtained last year.

The lack of authority and means to improve the city's own water system, and its capacity in quantity and quality of supply, compelled resort to other sources, to relieve the discomfort, insecurity of property from fires and other disadvantages and evils caused by the inadequacy of the water supply.

### CONTRACT WITH THE CITIZENS' WATER SUPPLY COMPANY.

In a communication to the Board of Public Improvements, dated February 16, I submitted a proposition made by the Citizens' Water Supply Company of Newtown to furnish a maximum daily supply of 3,000,000 gallons, at $65 per 1,000,000 gallons, for distribution in Long Island City. Other propositions were subsequently submitted—from the Jamaica Water Supply Company for a daily supply of 5,000,000 gallons, and from the Woodside Company for 1,500,000 gallons. The latter company had then actually no plant at its disposal to carry out its proposition, and the system of the Jamaica Company had the disadvantage of being at too great a distance from the Long Island City distributing system to convey the supply without considerable expenditure for a conduit line, for which the Department had no funds. After long deliberation the Board of Public Improvements authorized the making of a contract with the Citizens' Water Supply Company at the price of $65 per 1,000,000 gallons, the company to make, at its own expense, the necessary connections by mains, with meters, with the city's distributing system. The contract was executed on May 16, and on June 4 the delivery of water began at the rate of 968,000 gallons per day, which was gradually increased afterwards, until, at the close of the year, it amounted to 1,479,000 gallons. The water is of excellent quality, and the pressure in the Long Island City mains has been increased so that water is delivered to an elevation of 45 feet or more above the street grades. At the beginning this supply was all received through one connection with the distributing mains, but a second connection was made later, which has greatly improved the circulation and distribution of the water. The total cost of the supply, from June 4 to December 31, 1898, is $15,569.23.

### FLUSHING WATER PLANT.

This includes a pumping station and machinery, a new standpipe erected in 1897, supply wells and 15.04 miles of distributing mains, ranging in diameter from four inches to twelve inches, with 248 stop-cocks and 185 fire-hydrants. The average daily supply pumped and distributed in 1898 is 751,392 gallons. The plant was turned over to the city in better condition than the Long Island City plant, but improvements are desirable for which no funds are yet available.

### COLLEGE POINT PLANT.

Early in 1898 a new pumping-engine, contracted for by the former village authorities, was delivered, but no provision had been made for the foundations and other necessary work to place the engine in position and make it ready for use. There was a balance in the fund which had been provided for the water-works prior to 1898, but when bids for the contract for the foundations and other work were advertised for and received last November, the available balance was found to be about $3,000 less than the lowest bid for the contract. This was subsequently rectified by the Board of Estimate and Apportionment in making a transfer to the fund, and the contract was awarded and executed last December. A new standpipe has also been completed under a contract made prior to 1898. The College Point supply is also obtained from wells, and is distributed through 15.42 miles of water-mains of 6 inches, 8 inches, 10 inches and 12 inches diameter, with 94 stop-cocks and 94 fire-hydrants. The average daily supply distributed in 1898 is 567,561 gallons.

### WHITESTONE WATER PLANT.

This consists of a pumping station and machinery, and 10.42 miles of distributing mains of 4 inches, 6 inches, 8 inches, 10 inches and 12 inches diameter, with 46 stop-cocks and 91 fire-hydrants. The average daily supply obtained from the supply wells and distributed through the mains in 1898 is 141,355 gallons. It is entirely inadequate, and should be speedily supplemented by connecting with and drawing upon the College Point system, or by sinking or driving additional wells.

### WORK FOR 1898.

In the absence of authority and funds for new work and improvements, except the completion of work begun and provided for prior to 1898, as mentioned in foregoing paragraphs, the operations have necessarily been confined to maintenance and repairs.

The operation of the six pumping stations requires the services of 13 Enginemen, 9 Firemen and 4 Stokers.

The force which has been employed in the maintenance and repairs of the 64 miles of public water-mains, 479 stop-cocks and 437 fire-hydrants, includes 3 Mechanics and 13 Laborers, under a general Foreman and a Mechanical Engineer. The repair work has resulted in placing the distributing system in much better condition than it came under the charge of the Department, and included the placing of 21 new stop-cocks, 7 new hydrants, 17 new hydrant-boxes and 214 new taps for house services.

The following is a summary of the average daily supply and consumption of water for the year for which the Department collects water rents :

| | Gallons. |
|---|---|
| Long Island City, Station 1 | 609,443 |
| " " 2 | 520,000 |
| " " 3 | 757,190 |
| | 1,886,633 |
| Flushing Station | 751,392 |
| College Point Station | 567,561 |
| Whitestone Station | 141,355 |
| Total from city plants | 3,346,941 |
| From Citizens' Water Supply Company | 1,479,087 |
| Total | 4,826,028 |

## PRIVATE WATER COMPANIES.

The Citizens' Water Company of Newtown has three pumping stations, with 6 pumping-engines of 11,750,000 gallons aggregate daily capacity; a standpipe, 25 feet diameter, 50 feet high and 183,580 gallons capacity; a reservoir of 3,500,000 gallons capacity; 126 supply wells, from 20 to 78 feet deep; 44.3 miles of water-mains, of which 10 miles are from 10 to 16 inches diameter, 29 miles of 6 and 8 inches diameter and 4.3 miles of 2, 3 and 4 inches diameter; 200 stop-cocks and 339 fire-hydrants. The company supplies the territory of the Second Ward of the Borough of Queens, former Town of Newtown, besides the 1,500,000 gallons now supplied to the First Ward, former Long Island City, under the contract already mentioned in this report. The quality of the water is excellent.

The Jamaica Water Supply Company has pumping-engines of 6,000,000 gallons aggregate daily capacity; a standpipe, 50 feet diameter and 40 feet high; 26 supply wells, 47 feet deep, and 60 miles of distributing mains, averaging 8 inches in diameter, with 300 stop-cocks and 631 fire-hydrants. The company supplies the territory of the former Village and Town of Jamaica and surroundings, now the Fourth Ward of the Borough of Queens. The quality of the water is good.

The Woodhaven Water Company has pumping-engines of 3,000,000 gallons daily capacity, for which the steam-power is supplied by the Lalance and Grosjean Manufacturing Company; 2 reservoirs of 4,000,000 gallons capacity; 16 supply wells, from 98 to 143 feet deep, and 32 miles of water-mains, averaging 8 inches in diameter, with 480 fire-hydrants. The service of this company interlaces with that of the Jamaica Water Supply Company, and covers the southerly part of the Fourth Ward of the Borough of Queens. The quality of the water is good.

The Wyckoff Heights Water Company also supplies part of the Fourth Ward. The plant includes pumping-engines of 3,000,000 gallons daily capacity and 1¾ miles of 4 and 6 inch distributing mains, with 42 stop-cocks and 8 fire-hydrants.

The Queens County Water Company supplies the greater part of the Fifth Ward, formerly in the Town of Hempstead; its plant consists of pumping-engines of 10,000,000 gallons daily capacity; two standpipes, one of 20 inches diameter and 100 feet high, and the other 16 inches diameter and 125 feet high; 45 supply wells, from 32 to 50 feet deep; 37.43 miles of distributing mains, ranging in diameter from 2 to 16 inches; 357 stop-cocks and 278 fire-hydrants. The water is of excellent quality.

The anticipated growth of population and buildings in the Borough of Queens will demand large additions to the present capacities of water supply, proportionate and incident to the necessities for increasing the Brooklyn supply. Any large additional supply for the Borough of Brooklyn, and the additional conduit to convey it to the distributing system, will have to pass through the Borough of Queens. It will, therefore, be perfectly feasible, economical and advantageous to both boroughs and to the city to treat the two systems as one so far as acquisition of additional supply is concerned, and to build new conduits and their accessories on plans and of capacity to supply both boroughs.

## BOROUGH OF RICHMOND.

The city owns only one small water plant in this borough, located at Tottenville. It was recently improved under a contract made in 1897 by the trustees of the late Village of Tottenville, and completed last year under the direction of this Department, including with other work a new 10-inch well 84 feet deep and a force-pump connected with a small reservoir. The plant now includes two pumping-engines of 1,000,000 gallons daily capacity, 2 boilers of 200-horse power, a standpipe, 3 wells, 32,176 lineal feet, or 6 1-10 miles, of distributing mains, of which 700 feet were laid last year; 51 stop-cocks, and 60 fire-hydrants. The reliable daily yield of the wells is little more than 150,000 gallons per day, and funds should be provided for driving additional wells or for other sources of supply, to utilize the capacity of the pumping and distributing plant.

### PRIVATE WATER COMPANIES.

The Crystal Water Company supplies the population of the former Village or Town of Edgewater. It has two pumping stations, with three pumping-engines of 5,000,000 gallons daily capacity; a high service pumping-engine of 1,000,000 gallons daily capacity; 5 boilers of 320-horse power; a low-service reservoir of 4,000,000 gallons capacity; a standpipe for high service, 418 feet above tide level; 96 6-inch supply wells, 50 to 120 feet deep; 48 miles of distributing mains, ranging in diameter from 4 to 16 inches; 82 stop-cocks, 340 fire-hydrants and 65 hydrants for the use of the public.

The Staten Island Water Supply Company supplies the villages on the north shore of the island. The plant consists of 3 pumping-engines of 8,000,000 gallons daily capacity, 3 boilers of 340-horse power, a reservoir or standpipe 22 feet diameter and 80 feet high, 194 6-inch supply wells from 40 to 194 feet deep, 70 miles of distributing mains ranging in diameter from 4 to 16 inches and 590 fire-hydrants.

The plants of both companies are in good condition, and the combined daily supply pumped and distributed averages 6,500,000 gallons. The pressure in the delivery of water to houses on the hills of St. George, New Brighton and West Brighton is deficient.

Inspectors, under the direction of the Deputy Commissioner and Engineer for this borough, are constantly engaged in looking after the service of the two companies, as well as the service from the city's plant at Tottenville.

### FIRE-HYDRANT SERVICE BY PRIVATE WATER COMPANIES.

On taking charge of the water supply for Greater New York, this Department was not in possession of the contracts, or authenticated copies of contracts, which had been made prior to January 1, 1898, by the several municipalities which became consolidated with the city, for fire-hydrant service by private water companies, and such copies of contracts were not obtained, and their legality passed upon by the Law Department, until several months later. Consequently, no estimate could be given to the Board of Estimate and Apportionment at the beginning of the year, of the amounts required for such hydrant service for 1898, and no moneys were appropriated for it in the estimate and appropriations made by the Board in January. By April 26, sufficiently reliable data had been collected to form a proper basis for an estimate, and in a communication of that date to the Board of Public Improvements, I presented for its consideration and action, under subdivision 7, section 415 of the City Charter, the following estimate for 1898, which, in July, was approved and allowed by the Board of Estimate and Apportionment:

| | | | |
|---|---|---|---|
| Borough of Queens | 1,263 | hydrants | $25,564 00 |
| " Richmond | 960 | " | 26,052 50 |
| " Bronx | 465 | " | 18,600 00 |
| " Brooklyn | 1,218 | " | 61,145 00 |
| | 3,906 | hydrants | $131,361 50 |
| Service of 8 Inspectors, at $1,000 each per annum, for 5 months | | | 3,333 33 |
| Total | | | $134,694 83 |

There are twenty-six of these hydrant contracts in existence, for terms of from four to twenty years, and at prices ranging from $18 to $35 per annum for each hydrant. One contract, made September 15, 1881, by the Town of New Lots, now in the Borough of Brooklyn, for twenty-five years, even makes a price of $100 each for 100 hydrants, and $75 each for 50 hydrants. Five of the contracts were made in 1897, subsequent to the passage of the Greater New York Charter.

In two communications to the Board of Public Improvements, April 26, and August 17, I called attention to the great divergence in the prices stipulated in the contracts, and recommended that $20 per year for each hydrant be adopted as the maximum price for this service. On September 26, the Board adopted a form of supplementary agreement whereby private water companies are restricted to the charge of $20 per year per hydrant, including water supply for fire purposes, flushing sewers, and 500 gallons of water per day from each hydrant, for sprinkling streets and roads, for 200 days in the year. These conditions have since been applied on all permits to the companies for laying additional water-mains and placing additional hydrants, and without these permits and conditions the companies are prohibited from extending their mains and water service.

### NEW SCALE OF WATER RENTS.

The provisions of the Greater New York Charter in reference to a uniform scale of rents and charges for water supply are embodied in section 473, as follows:

Sec. 473. "The municipal assembly shall hereafter have all power, on recommendation of the board of public improvements, to fix and to establish a uniform scale of rents and charges for supplying water by the city of New York which shall be apportioned to different classes of buildings in said city in reference to their dimensions, values, exposure to fires, ordinary uses for dwellings, stores, shops, private stables and other common purposes, number of families or occupants, or consumption of water, as near as may be practicable, and modify, alter, amend and increase such scale from time to time, and to extend it to other descriptions of buildings and establishments. All extra charges for water shall be deemed to be included in the regular rents, which shall become a charge and lien upon the buildings upon which they are respectively imposed, and if not paid, shall be returned as arrears to the collector of assessments and arrears. Such regular rents, including the extra charges above mentioned, shall be collected from the owners or occupants of all such buildings, respectively, which shall be situated upon lots adjoining any street or avenue in said city in which the distributing water-pipes are or may be laid, and from which they can be supplied with water. Said rents, including the extra charges aforesaid, shall become a charge and lien upon such houses and lots, respectively, as herein provided, but no charge whatever shall be made against any building in which a water-meter may have been or shall be placed as provided in this act. In all such cases the charge for water shall be determined only by the quantity of water actually used as shown by said meters."

It will be noticed that no direct duty or responsibility in respect to the establishment of a new scale of water-rents devolves upon the Commissioner of Water Supply, except as one of the fourteen members of the Board of Public Improvements. It was reasonable to assume, however, that the Commissioner might be expected to take the initial action of bringing the subject before the Board, and that he would be called upon to present the statistics and conditions which the Board and the Municipal Assembly would require in their deliberations and action on this important branch of municipal legislation and government.

The fiscal year for the assessment, apportionment and collection of water-rents begins on May 1 of each year, and the water-rent books and charges for each ensuing year must be written up correctly and completely on or before that date. These books, for the Greater New York, contain more than 200,000 individual accounts, and a multiplied number of itemized charges. It occupies the time of the clerical force in the several boroughs for at least three months in each year to write up the books for the ensuing year, and to attend to current business at the same time; consequently, a new scale of rents would have to be established not later than January 31 in any year to become applicable for the ensuing fiscal year. This precluded the possibility of establishing a new scale for the fiscal year beginning May 1, 1898, and compelled the retention for that year, at least, of the then existing scales in the several boroughs. It also left at the disposition of the authorities the ample time which should be devoted to the deliberations on so important a subject.

There is considerable divergence between certain classes of charges in the old New York scale, the Brooklyn scale and the charges in the boroughs of Queens and Richmond, which are still in force.

In a communication, dated September 23, I submitted to the Board of Public Improvements a new scale, prepared by the Chief Engineer of this Department, from the standpoint of the Engineer, who desires ample means for works to improve and extend the water systems.

In further communications of December 7 and December 21, considerable modifications of the scale presented in September were recommended. In the several communications the following considerations were presented:

First—That the laws relating to the Brooklyn water supply, which, under the opinion of the Corporation Counsel, continue in force under the present City Charter, are mandatory in requiring that all expenses for the maintenance of the water system and for interest and redemption of the water debt be paid from the collections of revenue from the water service.

Second—That section 216 of the City Charter prohibits the alteration or reduction of any existing rates or charges which would diminish any of the sources of revenue of the Sinking Funds or the General Fund of the city, which prohibition must be recognized in establishing a new scale of water rents.

Third—That section 10, article 8, of the amended State Constitution separates bond issues for public water supply from other municipal indebtedness, and excludes the water debt from the limitation to ten per centum of the assessed valuation of real property subject to taxation; that this separation of water debt and bond issues for purposes of water supply from other municipal indebtedness is further provided for and required by section 208 of the City Charter, which requires the creation of a "Water Sinking Fund," into which are to be consolidated all the existing water sinking funds of the several municipalities merged into Greater New York, and to which are pledged all the moneys, funds, revenues and assets heretofore pledged and appropriated to each of said funds, for the liquidation of all indebtedness incurred on account of water supply.

Fourth—That from the foregoing provisions of the State Constitution and the present City Charter, construed together, the deduction may be drawn that the new scale of water-rents should be made with the view and for the purpose of producing sufficient revenue to pay for the maintenance of the water systems, and the support and liquidation of the existing water-debt and future bond issues for the improvement and enlargement of the systems, not only in the Borough of Brooklyn, where the law on that subject is direct and mandatory, but in the other boroughs as well—the greater city as a whole.

As further material for consideration, I presented in my communication of December 21, the following figures:

### BOROUGHS OF MANHATTAN AND BRONX.

| | | |
|---|---|---|
| Revenue from water service for 1898 (then partly estimated) | | $4,545,262 00 |
| Cost of maintenance, now paid from annual appropriations | $959,337 00 | |
| Interest on outstanding bonds | 2,200,000 00 | |
| One per cent. for sinking fund | 550,000 00 | |
| | | 3,709,337 00 |
| Surplus applicable to the support of further bond issues | | $835,925 00 |

### BOROUGH OF BROOKLYN.

| | | |
|---|---|---|
| Revenue for 1898 (then partly estimated) | | $2,124,277 00 |
| Less reduction by abolishment of charges on vacant lots | $80,000 00 | |
| And frontage rate on houses which have water-meters | 25,000 00 | |
| | | 105,000 00 |
| Net revenue for 1898 | | $2,019,277 00 |
| Cost of maintenance of water system | $822,910 00 | |
| Interest on debt of $17,000,000 | 752,921 00 | |
| One per cent. for sinking fund | 170,000 00 | |
| | | 1,745,831 00 |
| Surplus applicable to the support of further bond issues | | $273,446 00 |

### BOROUGH OF QUEENS.

| | |
|---|---|
| Cost of maintenance and repairs for 1898, including contract with the Citizens' Water Supply Company | $118,620 00 |
| Revenue for 1898, partly estimated | 73,800 00 |
| Deficiency | $44,820 00 |

In the Borough of Richmond the extent of the public water service and the revenue derived from it are so small that they need not enter into the present consideration of a new scale of water rents for the greater city.

The foregoing, partly estimated, figures will be somewhat modified by the actual revenues and expenditures for 1898, as now ascertained, but they were at the time, and even now, sufficiently close to demonstrate that the aggregate water revenue of Greater New York on the now and heretofore existing scales of rents and charges yields a surplus over and above the amounts required for maintenance of the water systems, interest and sinking funds, to support further bond issues for such improvements and enlargements of the systems as are immediately necessary or desirable to maintain the efficiency of the water service and meet the additional demands upon the water supply which the growth of the city in the next two or three years will create. In the mean time, if the authority and means to extend the water-mains and water service into new streets and territory are granted in proportion to the prospective advances in population and buildings, the water revenue will increase at a greater ratio than the cost of maintenance and of support of the water debt, and the yearly surplus for support of new bond issues will increase at a still greater ratio. Consequently, there is no financial necessity for increasing the rents and charges in a new scale of water rents, either in the average or the aggregate, and adjustment and equalization of the present diverging scales are all that the financial conditions require, bearing always in mind the prohibition against reducing the present sources of revenues of the sinking funds and the general fund of the city.

The entire subject is still in the hands of the Board of Public Improvements.

## REVENUE FROM THE WATER SERVICE FOR 1898.

### BOROUGHS OF MANHATTAN AND THE BRONX.

| | |
|---|---|
| Moneys collected and paid into the City Treasury— | |
| Regular and extra water rents | $1,735,241 80 |
| Penalties on water rents | 14,413 95 |
| Water supplied through meters | 2,075,185 32 |
| Water supplied to shipping | 128,006 74 |
| Water supplied for street sprinkling | 28,000 00 |
| Water supplied for building purposes | 40,575 74 |
| Water supplied for miscellaneous purposes | 4,084 52 |
| Permits to tap water-mains | 15,547 50 |
| Total collections | $4,041,055 57 |
| Amounts returned in arrears as liens on property | 418,348 60 |
| Total revenue for 1898 | $4,459,404 17 |

### *Comparisons with* 1897.

Moneys collected and paid into the City Treasury—

| | |
|---|---|
| Total collections in 1898 | $4,041,055 57 |
| Total collections in 1897 | 3,822,420 22 |
| Increase, 1898 over 1897 | $218,635 35 |

| | |
|---|---|
| Total revenue, including arrears, 1898 | $4,459,404 17 |
| Total revenue, including arrears, 1897 | 4,322,226 33 |
| Increase, 1898 over 1897 | $137,177 84 |

In the report of the Water Registrar, hereto appended, will be found a list of 151 charitable institutions in the boroughs of Manhattan and The Bronx which were declared exempt from charges for water supply in the years 1888 to 1897, under successive acts of the State Legislature, whose aggregate water rents amounted to $51,286 per year, and 10 institutions which have been added to the exempt list in 1898, under said acts and the advice of the Corporation Counsel, with an aggregate water rent of $4,557, making the present annual donation by the city in water supply to these institutions $55,833.

### BOROUGH OF BROOKLYN.

#### *Moneys Collected and Paid into the City Treasury.*

| | |
|---|---|
| Regular and extra water rents | $1,744,672 94 |
| Penalties on water rents | 18,228 23 |
| Water for building purposes | 8,778 95 |
| Permits for water supply (taps) | 9,720 50 |
| Arrears of water rents | 147,181 23 |
| Total | $1,928,581 85 |
| Revenue collected in 1897 | 2,062,799 61 |
| Decrease in 1898 from 1897 | $134,217 76 |

The decrease is accounted for by the abolishment, under the Greater New York Charter and the advice of the Corporation Counsel, of the charge assessed and collected from vacant lots and the frontage charge on houses which also pay meter charges which obtained in Brooklyn prior to 1898.

### BOROUGH OF QUEENS.

#### *Moneys Collected and Paid into the City Treasury.*

Water rents and permits to tap water-mains :

| | |
|---|---|
| First Ward (Long Island City) | $53,151 93 |
| Third Ward (Flushing, College Point and Whitestone) | 32,539 03 |
| Total | $85,690 96 |

The Department is not in possession of the necessary and reliable data for a comparison with the receipts of 1897 in the former Long Island City and the Villages of Flushing, College Point and Whitestone.

### BOROUGH OF RICHMOND.

*Moneys Collected and Paid into the City Treasury.*

| | |
|---|---|
| Water rents at meter rates | $132 48 |
| New taps in water-mains | 243 08 |
| Additional faucets, garden hose, etc | 37 76 |
| Total | $413 32 |

The revenue from the small water plant at Tottenville will be increased after authority and means are obtained to sink additional supply wells, and to lay additional distributing mains.

| | |
|---|---|
| The grand total of revenue from the public water service in Greater New York for 1898 is | $6,474,090 30 |

### SUMMARY OF EXPENDITURES FOR 1898.

Including all vouchers drawn on the Comptroller against appropriations and funds for 1898, and all outstanding liabilities incurred in 1898, by contracts, orders and otherwise, and excluding vouchers in payment of liabilities incurred prior to 1898.

On account of annual appropriations in the tax levy (section 226, City Charter):

| | | |
|---|---|---|
| Boroughs of Manhattan and The Bronx— | | |
| Vouchers drawn | $649,673 63 | |
| Liabilities | 200,984 60 | |
| | | $850,658 23 |
| Borough of Brooklyn— | | |
| Vouchers drawn | $135,303 35 | |
| Liabilities | 2,305 60 | |
| | | 137,608 95 |
| Borough of Queens— | | |
| Vouchers drawn | $83,360 92 | |
| Liabilities | 18,537 35 | |
| | | 101,898 27 |
| Borough of Richmond— | | |
| Vouchers drawn | $13,400 77 | |
| Liabilities | 1,373 19 | |
| | | 14,773 96 |
| Total on account of annual appropriations | | $1,104,939 41 |

| | | |
|---|---|---|
| On account of fund from collection of water revenue, Borough of Brooklyn (Brooklyn Consolidation Act of 1888, title 15, sections 5 and 6): | | |
| Water supply—Maintenance and Repairs— | | |
| Vouchers drawn | $419,714 99 | |
| Liabilities | 199,543 66 | |
| | | $619,258 65 |
| Distribution—Maintenance and Repairs— | | |
| Vouchers drawn | $145,364 87 | |
| Liabilities | 10,370 41 | |
| | | 155,735 28 |
| Total on account of Brooklyn water revenue | | $774,993 93 |
| On account of bond issues, authorized prior to 1898: | | |
| Boroughs of Manhattan and The Bronx— | | |
| Additional Water Fund, for sanitary protection of water supply (chapter 189, Laws of 1893): | | |
| Vouchers drawn | $514,368 92 | |
| Liabilities | .......... | |
| | | $514,368 92 |
| Croton Water Fund, for constructions and surveys in watersheds (New York City Consolidation Act of 1882, section 189): | | |
| Vouchers drawn | $95,013 48 | |
| Liabilities | 2,137 99 | |
| | | 97,151 47 |
| Water-main Fund (chapter 669, Laws of 1896): | | |
| Vouchers drawn | $30,915 90 | |
| Liabilities | 295 00 | |
| | | 31,210 90 |
| Fire-hydrant Fund (chapter 510, Laws of 1894): | | |
| Vouchers drawn | $4,429 42 | |
| Liabilities | 272 37 | |
| | | 4,701 79 |
| Borough of Queens— | | |
| Fund for Standpipe and Pumping Plant at College Point, contract of 1898: | | |
| Vouchers drawn | .......... | |
| Liabilities | $8,172 50 | |
| | | 8,172 50 |
| Total expenditures on bond issues | | $655,605 58 |

### RECAPITULATION.

Being the total expenditures and liabilities incurred in 1898, and excluding vouchers for liabilities incurred prior to 1898:

| | |
|---|---|
| Boroughs of Manhattan and The Bronx | $1,498,091 31 |
| Borough of Brooklyn | 912,602 88 |
| Borough of Queens | 110,070 77 |
| Borough of Richmond | 14,773 96 |
| Grand total | $2,535,538 92 |

Vouchers drawn in 1898, in payment of liabilities incurred prior to 1898:

| | | |
|---|---|---|
| Boroughs of Manhattan and Bronx— | | |
| Appropriation Accounts | $110,985 12 | |
| Bond Issue Accounts | 529,960 16 | |
| | | $640,945 28 |
| Borough of Brooklyn— | | |
| Appropriation Accounts | ......... | |
| Water Revenue Accounts | $126,045 92 | |
| Bond Issue Accounts | 106,561 51 | |
| | | 232,607 43 |
| Borough of Queens— | | |
| Bond Issue Accounts | | 10,210 21 |
| Total | | $883,762 92 |

### COMPARISONS—1897 AND 1898.

Including all expenditures and liabilities incurred in each year, and vouchers drawn in 1898, in payment of liabilities of 1897.

| | |
|---|---|
| Boroughs of Manhattan and Bronx— | |
| Department of Public Works, 1897 | $2,515,812 93 |
| Department of Water Supply, 1898 | 1,498,091 31 |
| Reduction | $1,017,721 62 |

| | |
|---|---|
| Borough of Brooklyn— | |
| Department of City Works, 1897 | $1,447,588 39 |
| Department of Water Supply, 1898 | 912,602 88 |
| Reduction | $534,985 51 |

A comparison with the expenditures in the boroughs of Queens and Richmond in 1897 cannot be made, because they were distributed among the former municipalities, towns and villages, and this Department is not in possession of the necessary data and figures for a comparison.

I append hereto the tabular statement of the General Bookkeeper, Document A, giving the expenditures and liabilities on each appropriation and fund, and the cash receipts from all sources; the report of the Chief Engineer, Document B, containing, among other details which are valuable but too numerous to be embodied in my report, tabular statistics in reference to private water companies and other subjects; and the report of the Water Registrar for the boroughs of Manhattan and The Bronx, with a list of all charitable institutions exempt from charges for water supply since 1886, and the revenue from the Croton water service since 1842.

Very respectfully,

WILLIAM DALTON, Commissioner of Water Supply.

## DOCUMENT "A."

*Statement Showing Titles of Appropriations, Appropriations with Transfers of* 1898, *Total Requisitions,* 1898, *Liabilities and Balances of Appropriations, December* 31, 1898; *also Titles of Trusts and Special Accounts, Total Requisitions,* 1898, *and Liabilities.*

| TITLES OF APPROPRIATIONS. | BOROUGHS. | APPROPRIATIONS WITH TRANSFERS, 1898. | TOTAL REQUISITIONS, 1898. | LIABILITIES. | BALANCES OF APPROPRIATIONS, DECEMBER 31, 1898. |
|---|---|---|---|---|---|
| Aqueduct—Repairs and Maintenance | Manhattan and Bronx | $265,552 00 | $209,502 72 | $41,256 16 | $14,793 12 |
| Aqueduct—Repairs and Maintenance—Salaries | " | 33,100 00 | 31,486 47 | .......... | 1,613 53 |
| Bronx River Works—Maintenance and Repairs | " | 31,025 00 | 23,337 84 | 1,451 37 | 6,235 79 |
| Bronx River Works—Maintenance and Repairs—Salaries | " | 3,900 00 | 3,100 00 | .......... | 800 00 |
| Laying Croton Pipes | " | 229,830 00 | 31,339 69 | 134,670 69 | 63,819 62 |
| Laying Croton Pipes—Salaries | " | 19,780 00 | 17,516 33 | 123 00 | 2,140 67 |
| Public Drinking Hydrants | " | 2,000 00 | 1,478 58 | 300 00 | 221 42 |
| Rentals of Hydrants | " | 18,600 00 | .......... | 18,600 00 | .......... |
| Repairing and Renewal of Pipes, Stop-Cocks, etc | " | 223,991 00 | 198,627 90 | 20,195 02 | 5,168 08 |
| Salaries—General Administration | " | 20,333 33 | 15,991 89 | .......... | 4,341 44 |
| Salaries—Deputy Commissioner, Chief Clerk and Employees | " | 35,240 00 | 34,523 12 | 8 57 | 708 31 |
| Salaries—Engineers, Clerks, Inspectors and Measurers | " | 72,610 00 | 69,564 49 | 237 50 | 2,808 01 |
| Salaries—Supplying Water to Shipping and for Building Purposes | " | 7,000 00 | 6,015 96 | 54 00 | 930 04 |
| Water for Twenty-fourth Ward | " | 10,400 00 | 7,188 64 | 3,111 36 | 100 00 |
| Salaries—Office of Deputy Commissioner | Brooklyn | 19,590 00 | 17,040 37 | .......... | 2,549 63 |
| Salaries—Office of Chief Engineer | " | 12,060 00 | 7,270 84 | .......... | 4,789 16 |
| Salaries—Office of Water Registrar | " | 59,540 00 | 58,671 81 | .......... | 868 19 |
| Salaries—Laboratory | " | 5,760 00 | 5,040 01 | .......... | 719 99 |
| Contingencies—Office of Deputy Commissioner | " | 1,000 00 | 219 35 | .......... | 780 65 |
| Contingencies—Office of Chief Engineer | " | 2,000 00 | 398 08 | 495 78 | 1,106 14 |

| Titles of Appropriation. | Boroughs. | Appropriations With Transfers, 1898. | Total Requisitions, 1898. | Liabilities. | Balances of Appropriations, December 31, 1898. |
|---|---|---|---|---|---|
| Contingencies—Office of Laboratory | Brooklyn | $2,675 00 | $804 24 | $1,809 82 | $60 94 |
| Rentals of Hydrants | " | 61,145 00 | 45,858 75 | 15,286 25 | .......... |
| Salaries—Office of Deputy Commissioner | Queens | 14,600 00 | 12,698 69 | .......... | 1,901 31 |
| Salaries—Pumping Stations | " | 22,200 00 | 21,182 63 | 12 00 | 1,005 37 |
| Pumping Stations—Fuel and Supplies | " | 34,750 00 | 12,072 85 | 16,996 01 | 5,681 14 |
| Maintenance and Repairs of Water Pipes | " | 19,520 00 | 15,645 79 | 1,541 34 | 2,332 87 |
| Telephonic Service | " | 1,350 00 | 582 75 | 600 00 | 167 25 |
| Supplying Water to Long Island City | " | 23,200 00 | 12,764 21 | 3,900 00 | 6,535 79 |
| Rentals of Hydrants | " | 25,564 00 | 8,414 00 | 17,150 00 | .......... |
| Pumping Plant Extension, College Point | " | 3,000 00 | .......... | 3,000 00 | .......... |
| Salaries—Office of Deputy Commissioner | Richmond | 4,466 67 | 4,283 57 | .......... | 183 10 |
| Pumping Stations—Salaries and Supplies | " | 4,000 00 | 3,016 44 | 953 89 | 29 67 |
| Contingencies | " | 250 00 | 40 76 | 191 30 | 17 94 |
| Rentals of Hydrants | " | 26,052 50 | 6,060 00 | 19,992 50 | .......... |
| Totals | .......... | $1,316,084 50 | $881,738 77 | $301,936 56 | $132,409 17 |

NOTE.—Requisitions were drawn during the year on liabilities against appropriations of previous years amounting to $110,985.12.

| TITLES OF TRUSTS AND SPECIAL ACCOUNTS. | BOROUGHS. | TOTAL REQUISITIONS, 1898. | LIABILITIES. |
|---|---|---|---|
| Additional Water Fund | Manhattan and Bronx.. | $514,368 92 | ........ |
| Croton Water Fund | " .. | 236,431 91 | $19,995 26 |
| Burnside Avenue Archway | " .. | 10,831 55 | ........ |
| Fire Hydrant Fund | " .. | 4,429 42 | ........ |
| Revenue Bond Fund—Readjustment of Pipes, Forty-second Street Reservoir | " .. | 1,623 18 | ........ |
| Water-Main Fund, No. 2 | " .. | 406,727 49 | 67,604 93 |
| Water-Meter Fund, No. 2 | " .. | 275 41 | ........ |
| Water Supply—Maintenance and Repairs—Salaries and Wages | Brooklyn | 342,038 93 | ........ |
| Water Supply—Maintenance and Repairs—Materials and Supplies | " | 186,993 88 | 199,543 66 |
| Water Supply—Distribution and Repairs—Salaries and Wages | " | 138,511 82 | ........ |
| Water Supply—Distribution and Repairs—Materials and Supplies | " | 6,853 05 | 10,370 41 |
| Water Maintenance, 1897 | " | 16,728 10 | ........ |
| Water Construction | " | 106,561 51 | ........ |
| Stand-Pipe, College Point | Queens | 7,407 13 | ........ |
| Stand-Pipe Fund, Flushing | " | 132 12 | ........ |
| College Point Water Works Fund | " | 2,770 96 | 5,172 50 |
| Totals | | $1,982,685 38 | $302,686 76 |

The above figures of liabilities on Trust and Special Accounts are approximate only, being largely dependent on pending proceedings of Commissioners of Appraisal, and because of incomplete information as to accounts of former municipalities outside of Manhattan and The Bronx.

*Statement of General Bookkeeper, Department of Water Supply, showing all Revenues of the City received through the Department during the Year* 1898.

| SOURCE OF REVENUE. | BOROUGHS. | | |
|---|---|---|---|
| Water rents | Manhattan and Bronx .. | $1,735,241 80 | |
| Penalties on water rents | " .. | 14,413 95 | |
| Water through meters | " .. | 2,075,185 32 | |
| Water for shipping | " .. | 128,006 74 | |
| Water for building purposes | " .. | 40,575 74 | |
| Water for street sprinkling | " .. | 28,000 00 | |
| Water for miscellaneous purposes | " .. | 4,084 52 | |
| Permits to tap water-mains | " .. | 15,547 50 | |
| | | $4,041,055 57 | |
| Add amount returned as in arrears | " .. | 418,348 60 | |
| | | | $4,459,404 17 |

| SOURCE OF REVENUE. | BOROUGHS. | | |
|---|---|---|---|
| Water rents | Brooklyn | $1,744,672 94 | |
| Penalties on water rents | " | 18,228 23 | |
| Water for building purposes | " | 8,778 95 | |
| Permits to tap water-mains | " | 9,720 50 | |
| Arrears | " | 147,181 23 | |
| | | | $1,928,581 85 |
| Water rents and permits to tap water-mains : | | | |
| First Ward—Long Island City | Queens | $53,151 93 | |
| Third Ward—Flushing, College Point and Whitestone | " | 32,539 03 | |
| | | | 85,690 96 |
| Water rents at meter rates | Richmond | $132 48 | |
| Extra water | " | 37 76 | |
| Permits to tap water-mains | " | 243 08 | |
| | | | 413 32 |
| Total revenue from water | | .......... | $6,474,090 30 |
| Miscellaneous receipts, labor and material, proceeds of public sales, etc. : | | | |
| Manhattan and The Bronx | | $830 37 | |
| Brooklyn | | 1,719 59 | |
| | | | $2,549 96 |

E. BEARDSLEY, General Bookkeeper.

BUREAU OF THE CHIEF ENGINEER.

WILLIAM DALTON, Esq., *Commissioner of Water Supply :*

DEAR SIR—Under your instructions with this please find a statement of the operations of this Bureau during the quarter ending December 31, 1898, and a summary, etc., of the year 1898.

### BOROUGHS OF MANHATTAN AND BRONX.

SUMMARY OF EXPENDITURES FOR THE QUARTER ENDING DECEMBER 31, 1898.

| | |
|---|---|
| Additional Water Fund | $20,448 02 |
| Aqueduct Repairs and Maintenance | 63,450 68 |
| Aqueduct Repairs and Salaries | 8,635 56 |
| Bronx River Works Maintenance and Repairs | 7,832 72 |
| Bronx River Works Salaries | 975 00 |
| Croton Water Fund | 77,136 73 |
| Laying Croton pipes | 26,817 41 |
| Laying Croton pipes, Salaries | 5,172 50 |
| Public Drinking Hydrants | 938 47 |

| | |
|---|---|
| Repairing and renewal of pipes, etc. | $58,435 14 |
| Revenue Bond Fund (Forty-second Street Reservoir) | 318 23 |
| Salaries, Engineer, etc | 649 98 |
| Water Main Fund, No. 2 | 23,831 00 |
| Water Supply, Twenty-fourth Ward | 2,223 74 |
| Rentals of Hydrants, Brooklyn | 23,072 50 |
| Rentals of Hydrants, Queens | 8,414 00 |
| | $328,351 68 |

SUMMARY OF EXPENDITURES FOR THE YEAR 1898.

| | |
|---|---|
| Additional Water Fund | $514,922 42 |
| Aqueduct Repairs and Maintenance | 247,942 28 |
| Aqueduct Repairs Salaries | 31,486 47 |
| Bridge over Harlem river, Third avenue | 1,083 33 |
| Bronx River Works, Maintenance and Repairs | 25,631 37 |
| Bronx River Works, Salaries | 3,100 00 |
| Burnside Avenue Archways | 10,831 55 |
| Croton Water Fund | 236,431 91 |
| Fire Hydrant Fund | 4,922 88 |
| Laying Croton Pipes | 83,719 11 |
| Laying Croton Pipes, Salaries | 17,363 58 |
| Public Drinking Hydrants | 1,478 58 |
| Repairing and renewal of pipes, etc | 209,048 14 |
| Revenue Bond Fund (Forty-second Street Reservoir) | 1,623 18 |
| Salaries, Engineer, etc | 2,432 18 |
| Water Main Fund | 381,591 39 |
| Water Supply, Twenty-fourth Ward | 7,763 62 |
| Rentals of Hydrants, Brooklyn | 53,645 00 |
| Rentals of Hydrants, Queens | 8,414 00 |
| Rentals of Hydrants, Richmond | 6,060 00 |
| | $1,849,490 99 |

## CONTRACTS MADE, COMPLETED AND UNFINISHED DURING THE YEAR 1898.

| Location and Work. | Contractor. | Date Contract. | Estimated Cost. | Date Final Estimate. | Amount of Final Estimate. | Amount Paid in 1898. |
|---|---|---|---|---|---|---|
| Furnishing and laying water-mains in Fifth avenue.... | William P. Baird................ | Aug. 24, 1896 | $452,460 00 | Jan. 22, 1898 | $434,070 36 | $41,809 84 |
| Burnside avenue archways.......................... | A. C. Gildersleeve.............. | Nov. 20, " | 51,865 00 | June 30, " | 53,377 25 | 10,156 55 |
| Byram Pond Reservoir............................. | P. F. Curran.................... | Dec. 31, " | 57,555 00 | " 1, " | 66,757 45 | 11,804 36 |
| Keepers' houses at Muscoot Reservoir, Middle Branch Reservoir.................................... | John McQuade . ............... | Jan. 6, 1897 | 11,500 00 | Jan. 20, " | 11,500 00 | 2,500 00 |
| Furnishing cast-iron pipe, etc. ....................... | Warren Fg. Machine Company... | Feb. 9, " | 37,689 50 | " 14, " | 44,703 16 | 4,908 19 |
| Furnishing coal....................................... | William C. Moquin............ | " 9, " | 28,800 00 | Mar. 11, " | 28,817 68 | 13,683 06 |
| Laying mains in Amsterdam avenue, etc............. | J. S. Rodgers.................. | Mar. 12, " | 27,521 00 | Jan. 28, " | 27,466 82 | 4,064 63 |
| Laying mains in Pleasant avenue, etc................ | John Cornwell, Jr.............. | Apr. 23, " | 21,704 55 | Oct. 4, " | 20,541 09 | 1,027 05 |
| Furnishing and laying mains in Third street, etc....... | " .............. | " 23, " | 104,315 55 | June 21, " | 105,980 51 | 41,848 86 |
| Furnishing double nozzle hydrants.................. | Kennedy Valve Manufacturing Company................... | June 22, " | 7,550 00 | May 9, " | 7,550 00 | 7,550 00 |
| Laying mains in Burnside avenue, etc................ | Martin Lipps.................. | July 2, " | 16,636 00 | Aug. 21, " | 15,150 06 | 5,536 92 |
| Laying mains in Amsterdam avenue, etc.............. | " .................. | Sept. 14, " | 6,304 03 | July 13, " | 6,842 04 | 2,714 54 |
| Facing bank, Highbridge............................ | Patrick F. Burns.............. . | " 16, " | 16,050 00 | ............ | .......... | 13,491 00 |
| Furnishing and laying mains in Eleventh avenue, etc.. | T. A. Gillespie Company......... | Dec. 6, " | 275,397 50 | ............ | .......... | 263,367 44 |
| Furnishing and laying mains in Webster avenue....... | " ......... | " 6, " | 61,584 70 | Oct. 26, 1898 | 55,030 46 | 52,278 94 |
| Improvement of White Pond, etc. .................... | John Twiname, Jr...........<br>B. S. Palmer................. | " 8, " | 48,837 50 | ............ | .......... | 29,782 24 |
| Furnishing and laying mains in Fort George avenue... | Martin Lipps.................. | Feb. 2, 1898 | 22,745 20 | ............ | .......... | 6,216 12 |
| Furnishing stop-cocks, etc........................... | Fox & Engel................... | May 12, " | 4,253 50 | ............. | .......... | 3,144 15 |
| Furnishing whitewood plugs, etc..................... | " .................. | " 12, " | 2,998 40 | Sept. 9, 1898 | 2,998 82 | 2,998 82 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Furnishing cast-iron water pipes | " | " 25, " | 9,598 60 | Dec. 15, " | 9,931 42 | 9,931 42 |
| Furnishing cast-iron water pipes | Warren Fg. Machine Company | " 20, " | 35,178 00 | ............ | .......... | 24,433 27 |
| Furnishing coal | Theo. F. Tone | June 1, " | 30,730 00 | ............ | .......... | 17,954 55 |
| Furnishing tapping cocks, etc. | Kennedy Valve Manufacturing Company | " 7, " | 2,130 00 | Dec. 25, 1898 | 2,133 51 | 2,133 51 |
| Furnishing stop-cocks, etc | Knnedy Valve Manufacturing Company | " 7, " | 9,537 50 | " 31, " | 9,537 50 | 9,537 50 |
| Furnishing and laying mains across Harlem river, etc. | Peter Fruh | Sept. 2, " | 53,000 00 | ............ | .......... | ............ |
| Furnishing and laying mains in Southern Boulevard | Martin Lipps | Oct. 31, " | 39,681 50 | ............ | .......... | ............ |

## STORAGE RESERVOIRS.

The Croton river has furnished a full supply to the Aqueduct since October 20, 1898.

| *Storage Drawn during the Quarter.* | Gallons. |
|---|---|
| East Branch Reservoir | 1,400,000,000 |
| West Branch Reservoir | 1,000,000,000 |
| Quarter | 2,400,000,000 |

| *Storage Drawn during the Year.* | Gallons. |
|---|---|
| East Branch Reservoir | 3,430,000,000 |
| West Branch Reservoir | 3,400,000,000 |
| Middle Branch Reservoir | 400,000,000 |
| Titicus Reservoir | 500,000,000 |
| Muscoot Reservoir | 900,000,000 |
| Total gallons drawn | 8,630,000,000 |

All of the reservoirs are now full.

The work at White pond and outlet has been carried on steadily. The dam is completed, and the pond is gradually filling.

Surveys and plans for a reservoir on the Cross river branch of the Croton river are now being completed, and the necessary maps of lands required for same are being prepared.

## BRONX AND BYRAM RIVER SUPPLY.

No storage has been drawn during the quarter.

| *Storage Drawn during the Year.* | Gallons. |
|---|---|
| Kensico Reservoir | 490,000,000 |
| Rye Ponds Reservoir | 620,000,000 |
| Total drawn during the year | 1,110,000,000 |

Kensico Reservoir has filled during the quarter, and Rye Ponds and Byram Reservoirs are gradually filling. The contract for relaying 48-inch conduit on Webster avenue at Woodlawn has been completed. The full capacity of this conduit is now in use during the summer, and it becomes necessary to increase this supply of 20,000,000 gallons per day in order to supply the Twenty-third and Twenty-fourth Wards, by building a pumping plant at Jerome Park Reservoir to supply the higher portions of same and by laying a 48-inch main from the Croton Aqueduct at Jerome Park Reservoir to the lower portions of the Twenty-third Ward.

Surveys are being made to the east and south of the Byram and Croton sheds, in the State of New York, for a further supply.

RAINFALL, INCHES.

| | OCTOBER. | NOVEMBER. | DECEMBER. | QUARTER. | YEAR 1898. |
|---|---|---|---|---|---|
| Boyd's Corner Reservoir | 4.84 | 6.81 | 2.20 | 13.85 | 56.48 |
| Middle Branch Reservoir | 4.63 | 6.34 | 2.44 | 13.41 | 54.59 |
| Kensico Reservoir | 7.78 | 6.57 | 2.89 | 17.24 | 56.34 |
| Croton Dam | 4.76 | 5.74 | 2.50 | 13.00 | 56.00 |
| Central Park Reservoir | 5.89 | 4.56 | 2.65 | 13.10 | 4.417 |

This rainfall during the year has been above the average at all of the stations, except Central Park, and as the heavy rainfalls have occurred in August and October, but little storage has been drawn. .

The electrozone plant at Brewsters, and dry pan method at Mount Kisco, have been carried on, treating sewerage of these villages during the year.

STORAGE.

| YEAR. | RESERVOIRS. | GALLONS. |
|---|---|---|
| 1870 | Lakes Kirk, Mahopac, Gleneida and Gilead and Barrett's Pond, capacity | 1,600,000,000 |
| 1873 | Boyd's Corners Reservoir, capacity | 2,700,000,000 |
| 1878 | Middle Branch Reservoir, capacity | 4,000,000,000 |
| 1891 | East Branch Reservoirs, capacity | 8,000,000,000 |
| 1893 | Titicus Reservoir, capacity | 7,000,000,000 |
| 1895 | West Branch Reservoir, capacity | 10,000,000,000 |
| 1897 | Muscoot Reservoir, capacity | 7,000,000,000 |
| 1898 | White Pond Reservoir, capacity | 200,000,000 |
| | Total storage | 40,500,000,000 |
| | Total storage in Croton Watershed | 40,500,000,000 |
| | *In Bronx and Byram Watersheds.* | |
| 1884 | Kensico Reservoir | 1,600,000,000 |
| 1886 | Rye Ponds Reservoir | 1,300,000,000 |
| 1898 | Byram Pond Reservoir | 800,000,000 |
| | Total storage capacity, gallons | 44,200,000,000 |
| 1871 | High Service Plant at High Bridge, capacity per day | 6,000,000 |
| 1880 | High Service Plant at Ninety-eighth street and Ninth avenue, capacity, per day | 15,000,000 |
| 1892 | Increase at Ninety-eighth street, capacity per day | 10,000,000 |
| 1896 | High Service Plant at One Hundred and Seventy-ninth street and Tenth avenue, capacity per day | 28,000,000 |

## ADDITIONAL WATER FUND.

Under chapter 189, Laws of 1893, the following lands have been taken :

| | Acres. |
|---|---|
| East Branch Croton river | 349 |
| West Branch Croton river | 389 |
| Middle Branch Croton river | 369 |
| Around Lake Gleneida | 235 |
| Muscoot river | 398 |
| Around Kensico Reservoir | 97 |
| Along Bear Gutter creek and around Byram pond | 376 |
| Around White pond and outlet | 278 |
| In Mount Kisco and vincinity | 101 |
| In Towner's and Patterson | 67 |
| Total acres | 2,639 |

Amount expended on this account to December 1, 1888, has been.... .......... $2,445,015 86

More than half of this area consisted of small plots with houses, barns. etc., in the several villages of Brewsters, Carmel, Kensico, Mount Kisco, Farmer's Mills, Towner's, Patterson, Amawalk and Somer's Centre.

## RAINFALL.

*At Storage Reservoir, Boyd's Concerns, Putnam County, inluding Melted Snow.*

| MONTH. | 1866. | 1867. | 1868. | 1869. | 1870. | 1871. | 1872. | 1873. | 1874. | 1875. | 1876. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| January | 3.33 | 2.11 | 2.90 | 3.79 | 4.51 | 3.80 | 1.44 | 5.66 | 6.96 | 2.74 | 1.42 |
| February | 3.60 | 3.00 | 1.38 | 3.64 | 6.40 | 3.81 | 1.22 | 3.09 | 2.78 | 3.47 | 4.91 |
| March | 3.33 | 1.49 | 2.55 | 5.48 | 3.80 | 4.27 | 2.59 | 3.08 | 1.57 | 4.99 | 6.33 |
| April | 3.79 | 3.74 | 3.87 | 2.11 | 5.45 | 3.01 | 3.04 | 3.77 | 6.31 | 3.04 | 4.43 |
| May | 5.62 | 6.86 | 8.79 | 4.52 | 2.30 | 3.45 | 3.69 | 2.91 | 1.99 | 1.08 | 3.99 |
| June | 4.45 | 5.28 | 4.53 | 3.59 | 2.06 | 5.73 | 4.00 | 0.71 | 3.57 | 3.02 | 2.52 |
| July | 4.01 | 5.25 | 2.13 | 2.26 | 3.43 | 5.07 | 4.34 | 2.21 | 5.98 | 3.10 | 3.42 |
| August | 6.56 | 10.04 | 6.98 | 1.92 | 5.10 | 5.24 | 5.99 | 5.73 | 2.75 | 10.33 | 1.20 |
| September | 4.92 | 3.62 | 9.33 | 3.20 | 2.85 | 1.44 | 3.69 | 3.73 | 3.56 | 2.11 | 5.21 |
| October | 5.09 | 3.66 | 0.87 | 9.46 | 4.73 | 6.18 | 2.15 | 5.13 | 2.40 | 3.61 | 1.50 |
| November | 3.80 | 3.10 | 4.65 | 2.43 | 2.51 | 4.35 | 4.91 | 3.72 | 2.72 | 4.61 | 3.40 |
| December | 3.27 | 2.62 | 2.35 | 5.96 | 1.49 | 2.59 | 3.68 | 4.13 | 1.78 | 1.56 | 2.35 |
| Total | 51.77 | 50.77 | 50.33 | 48.36 | 44.63 | 48.94 | 40.74 | 43.87 | 42.37 | 43.66 | 40.68 |

| MONTH. | 1877. | 1878. | 1879. | 1880. | 1881. | 1882. | 1883. | 1884. | 1885. | 1886. | 1887. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| January | 2.68 | 4.49 | 2.52 | 4.00 | 4.19 | 4.41 | 2.80 | 5.07 | 5.59 | 5.25 | 5.68 |
| February | 0.80 | 3.65 | 2.85 | 2.92 | 5.28 | 5.96 | 5.21 | 6.31 | 4.65 | 5.20 | 6.01 |
| March | 7.66 | 3.10 | 4.96 | 4.51 | 6.14 | 4.58 | 1.67 | 4.82 | 1.29 | 3.86 | 3.60 |
| April | 2.35 | 2.85 | 5.10 | 3.99 | 1.67 | 1.36 | 3.94 | 2.96 | 2.09 | 3.61 | 3.47 |
| May | 0.85 | 4.97 | 2.45 | 1.17 | 3.74 | 6.30 | 2.86 | 4.33 | 2.44 | 4.54 | 0.32 |
| June | 4.95 | 4.65 | 5.29 | 1.28 | 5.72 | 3.04 | 5.64 | 2.04 | 1.19 | 3.09 | 7.70 |
| July | 4.65 | 4.28 | 5.95 | 5.65 | 2.45 | 3.64 | 4.26 | 6.54 | 5.27 | 4.40 | 13.32 |
| August | 2.54 | 2.66 | 5.83 | 3.60 | 1.71 | 3.92 | 2.09 | 4.50 | 7.35 | 3.21 | 7.06 |
| September | 1.49 | 6.61 | 3.43 | 2.69 | 0.75 | 14.33 | 2.45 | 1.69 | 1.09 | 2.30 | 2.00 |
| October | 8.38 | 3.78 | 0.95 | 3.25 | 3.65 | 3.33 | 6.99 | 3.74 | 5.19 | 2.28 | 3.12 |
| November | 8.16 | 4.36 | 2.49 | 2.97 | 4.50 | 1.66 | 1.79 | 4.37 | 5.99 | 5.57 | 2.69 |
| December | 1.52 | 8.74 | 4.26 | 2.49 | 6.53 | 2.68 | 3.45 | 7.34 | 3.84 | 4.29 | 6.71 |
| Total | 46.03 | 54.14 | 46.08 | 33.52 | 46.33 | 55.20 | 43.15 | 53.71 | 45.99 | 47.59 | 61.68 |

| MONTH. | 1888. | 1889. | 1890. | 1891. | 1892. | 1893. | 1894. | 1895. | 1896. | 1897. | 1898. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| January | 5.56 | 5.14 | 2.03 | 9.76 | 5.95 | 4.03 | 3.40 | 4.85 | 1.09 | 4.07 | 5.82 |
| February | 5.07 | 2.33 | 4.94 | 8.02 | 1.22 | 8.05 | 5.01 | 1.85 | 6.65 | 3.14 | 5.55 |
| March | 6.44 | 1.86 | 5.66 | 3.36 | 3.90 | 4.52 | 1.62 | 1.88 | 6.86 | 3.68 | 2.64 |
| April | 2.68 | 4.43 | 3.03 | 3.77 | 1.08 | 3.55 | 3.07 | 5.63 | 1.48 | 2.78 | 3.84 |
| May | 6.27 | 3.22 | 5.74 | 1.36 | 5.74 | 8.18 | 6.90 | 2.41 | 3.09 | 5.56 | 7.07 |
| June | 2.00 | 4.51 | 3.56 | 1.81 | 3.64 | 2.33 | 1.59 | 2.16 | 3.79 | 2.89 | 1.50 |
| July | 2.43 | 7.74 | 5.46 | 2.97 | 5.05 | 2.38 | 1.75 | 3.95 | 3.18 | 13.03 | 4.78 |
| August | 6.87 | 2.90 | 4.70 | 5.61 | 6.22 | 7.06 | 1.42 | 3.10 | 4.56 | 5.63 | 9.26 |
| September | 10.77 | 6.13 | 6.86 | 1.89 | 2.65 | 2.65 | 7.69 | 1.16 | 6.50 | 1.74 | 1.97 |
| October | 4.80 | 4.85 | 7.63 | 2.15 | 0.92 | 6.42 | 5.94 | 3.55 | 2.17 | 1.94 | 4.84 |
| November | 4.49 | 8.45 | 1.12 | 3.86 | 7.85 | 3.32 | 4.17 | 2.91 | 3.96 | 6.44 | 6.81 |
| December | 6.13 | 2.94 | 3.71 | 5.65 | 1.15 | 5.34 | 4.43 | 4.88 | 2.72 | 6.56 | 2.20 |
| Total | 63.51 | 54.50 | 54.44 | 48.19 | 45.37 | 57.83 | 46.99 | 38.33 | 46.05 | 57.46 | 56.28 |

## AQUEDUCT—REPAIRS

*Work Done during*

| | Earth Excavation, Cubic Yards. | Stone Quarried, Cubic Yards. | Dry Stone Masonry, Cubic Yards. | Stone Masonry, Cubic Yards. | Fence Built, Lineal Feet. | Fence Repaired, Lineal Feet. |
|---|---|---|---|---|---|---|
| Division 1 | .... | .... | .... | .... | .... | .... |
| " 2 | .... | .... | .... | .... | 2,274 | .... |
| " 3 | 266 | 50 | 20 | 14 | 625 | .... |
| " 4 | .... | 25 | .... | 27 | .... | 740 |
| " 5 | .... | .... | 41 | .... | 262 | 300 |
| " 6 | .... | .... | .... | .... | 380 | 800 |
| " 7 | .... | .... | .... | 4 | .... | .... |
| " 8 | .... | .... | .... | .... | .... | .... |
| Totals | 266 | 75 | 61 | 45 | 3,541 | 1,840 |

*Work Done during*

| | Earth Excavation, Cubic Yards. | Stone Quarried, Cubic Yards. | Dry Stone Masonry, Cubic Yards. | Stone Masonry, Cubic Yards. | Filling and Grading, Cubic Yards. | Brick Masonry, Cubic Yards. | Drain Laid, Lineal Feet. | Paving Gutter, Lineal Feet. | Spreading Gravel, Cubic Yards. | Curb Set, Lineal Feet. | Flagging Laid, Square Feet. | Coping Set, Lineal Feet. | Pointing Masonry, Square Feet. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Division 1 | .... | .... | 88 | .... | .... | .... | .... | .... | .... | .... | .... | .... | ... |
| " 2 | 121 | .... | 154 | .... | 60 | .... | .... | .... | .... | .... | .... | .... | 1,100 |
| " 3 | 596 | 50 | 92 | 14 | 153 | .... | 65 | .... | .... | .... | .... | .... | 40 |
| " 4 | 808 | 25 | .... | 27 | 658 | 187 | 38 | .... | .... | .... | .... | .... | .... |
| " 5 | 49 | 17 | 61 | .... | 599 | .... | .... | 60 | 53 | .... | .... | .... | .... |
| " 6 | 639 | 50 | .... | .... | 849 | .... | .... | .... | 50 | 328 | 243 | 110 | .... |
| " 7 | .... | .... | 4 | 4 | 275 | 67 | .... | .... | .... | .... | .... | .... | 4,188 |
| " 8 | 50 | .... | .... | .... | 25 | 27 | .... | .... | .... | .... | 200 | .... | .... |
| Totals | 2,263 | 142 | 399 | 45 | 2,619 | 281 | 103 | 60 | 103 | 328 | 443 | 110 | 5,328 |

AND MAINTENANCE.

*the Quarter.*

| Fence Painted, Lineal Feet. | Iron Railing Painted, Lineal Feet. | Iron Railing Set, Lineal Feet. | Fence Gates Built. | Telephone Poles Set. | Filling and Grading, Cubic Yards. | Pointing Coping, Lineal Feet. | Pointing Masonry, Square Feet. | Brick Masonry, Cubic Yards. | Brick Hauled. | Sand Hauled, Cubic Yards. |
|---|---|---|---|---|---|---|---|---|---|---|
| .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .. |
| .... | ..... | .... | 8 | 70 | .... | .... | .... | .... | .... | .. |
| 1,651 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .. |
| .... | .... | .... | .... | .... | 200 | .... | .... | .... | 30,000 | 30 |
| 1,458 | .... | .... | .... | .... | 43 | .... | .... | .... | 4,000 | . |
| 1,950 | .... | .... | .... | .... | 125 | .... | .... | .... | 8,000 | .. |
| .... | 3,100 | 104 | .... | .... | .... | 2,656 | 4,188 | 44 | .... | .. |
| .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .. |
| 5,059 | 3,100 | 104 | 8 | 70 | 368 | 2,656 | 4,188 | 44 | 42,000 | 30 |

*the Year* 1898.

| Pointing Coping, Lineal Feet. | Hauling Sand, Cubic Yards. | Hauling Bricks. | Iron Railing Set. | Iron Railing Painted. | Fence Built, Lineal Feet. | Fence Repaired, Lineal Feet. | Fence Painted, Lineal Feet. | Fence Gates Built. | Fence Posts Set. | Telephone Poles Set. | Screens put in Old Gate-house. | Built Wooden Bridges Over Brooks. | Sodding, Square Yards. | Spreading Manure Loads. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .... | .... | ...... | .... | .... | .... | 160 | .... | 8 | .... | .... | 10 | .... | .... | .... |
| .... | .... | ...... | .... | .... | 3,711 | 400 | 57 | .... | .... | 70 | .... | 5 | .... | .... |
| .... | .... | ...... | .... | .... | 1,985 | .... | 5,818 | .... | .... | .... | .... | .... | .... | 40 |
| .... | 30 | 30,000 | .... | .... | 300 | 1,330 | .... | .... | .... | .... | .... | .... | .... | .... |
| .... | .... | 4,000 | .... | .... | 1,672 | 1,050 | 1,458 | .... | .... | .... | .... | .... | .... | .... |
| .... | .... | 8,000 | .... | .... | 2,630 | 3,350 | 1,950 | .... | 500 | .... | .... | .... | 50 | .... |
| 2,656 | .... | ...... | 104 | 3,100 | .... | .... | .... | .... | 8 | .... | .... | .... | 330 | .... |
| .... | .... | ...... | .... | .... | 500 | 150 | .... | .... | .... | .... | .... | .... | .... | .... |
| 2,656 | 30 | 42,000 | 104 | 3,100 | 10,798 | 6,440 | 9,283 | 8 | 508 | 70 | 10 | 5 | 380 | 40 |

The usual work of keeping the aqueducts and grounds, the reservoirs and surrounding lands, the lands along the rivers taken for sanitary purposes, the fences, gate houses and telephone line in good order and repair, the operation of two pumping stations at Ninety-eighth street and One Hundred and Seventy-ninth street and the general supervision of the water shed have been continued during the year.

The contract for facing the bank at the west end of Highbridge has been completed.

In October the old aqueduct was cleaned out and water again passed through same to the city, it having been shut off for changes at Burnside avenue and Jerome Park Reservoir since November, 1896, starting wlth 2 feet in depth, it was gradually increased in depth to 5 feet; on December 12, a leak developed at the arch over the Sing Sing kill, which was built to carry the masonry of the aqueduct over this stream; on shutting off the water and draining the aqueduc it was found that the aqueduct had given away on the west side over and south of the south abutment of this arch, for a distance of 100 feet; the force of the water, with the help of the severe cold weather and frost, had cracked the south abutment and west facing above the arch stone, but not destroying the stability of the arch over the stream. Work is now being carried on inside the aqueduct, tearing out the weak and cracked portions of masonry and obtaining the necessary materials to repair same. Plans are being made for the outside facing of the abutment and arch and reinforcement of same, which will be ready for letting contract for same in the spring.

All of the water now supplied to the city is obtained through the new aqueduct which is in good order and has shown no defects during the year.

A gang of men have been employed during the quarter and year keeping in order, cleaning and making necessary repairs to the numerous large stop-cocks on the mains throughout the city.

### LAYING CROTON PIPES.

There was no work done during the quarter ending December 31, 1898. The ordinances in the Municipal Assembly not having passed in time to do any work. Contracts, etc., are now being prepared for the carrying out of the several ordinances passed by the Municipal Assembly and approved by the Mayor, in November and December, 1898.

### STREETS AND AVENUES IN WHICH WATER-MAINS HAVE BEEN LAID IN 1898.

(*R*) *Mains Reset and Replacing Others.*

48-inch pipe—

Webster avenue, north and south of Two Hundred and Thirty-third street (R).

36-inch pipe—

One Hundred and Twenty-fifth street, Third to Madison avenues.

High Bridge, from Shaft No. 25, new aqueduct to pumping station.

Eleventh avenue and Western Boulevard, Fifty-ninth street to One Hundred and Seventy-ninth street.

One Hundred and Seventy-ninth street, Western Boulevard to Amsterdam avenue.

West Broadway, West Fourth to West Third street.

Fourth street, West Broadway to Lafayette place.

36-inch pipe—

Lafayette place, Fourth to Bond street.
Elm street, Bond to Chambers street.

20-inch pipe—

At intersection of One Hundred and Twenty-fifth street and Park avenue.
Third street, West Broadway to Greene street.
Greene street, Third to Canal street.
Thompson street, Third to Canal street.
West Broadway, Third to Fulton street.

12-inch pipe—

Amsterdam avenue, Fifty-eighth to Seventy-first street.
Boulevard, Manhattan to One Hundred and Twenty-second streets.
One Hundred and Twenty-second street, Boulevard to Riverside Drive.
Fort George avenue, One Hundred and Ninetieth street to Amsterdam avenue.
Burnside avenue, Jerome to Sedgwick avenue.
Webster avenue, Suburban street to Tower place (R).
Tremont avenue, Ryer to Morris avenue (R).
Southern Boulevard, Perry to Briggs avenue (R).
Tremont avenue, Webster to Ryer avenue (R).
Lispenard street, between Broadway and West Broadway.
Walker street, between Broadway and West Broadway.
White street, between Broadway and West Broadway.
Franklin street, between Broadway and West Broadway.
Leonard street, between Broadway and West Broadway.
Worth street, between Broadway and West Broadway.
Thomas street, between Broadway and West Broadway.
Duane street, between Broadway and West Broadway.
Reade street, between Broadway and West Broadway.
Warren street, between Broadway and West Broadway.
Murray street, between Broadway and West Broadway.
Barclay street, between Broadway and West Broadway.
Park place, between Broadway and West Broadway.
Vesey street, between Broadway and West Broadway.
Elm street, between Great Jones and Bond street.

6-inch pipe—

One Hundred and Sixty-third street, from Tinton to Union avenue.
Union nvenue, from Home to One Hundred and Sixty-eighth street (R).
Union avenue, from One Hundred and Sixty-eighth street to Boston road (R).
Jansen avenue, from Terrace View avenue to a point 500 feet south (R).
Simpson street, from Freeman to One Hundred and Sixty-seventh street.

6-inch pipe—

One Hundred and Forty-first street, from Brook to St. Ann's avenue.

Travers street, from Jerome to Bainbridge avenue (R).

One Hundred and Sixty-third street, from Amsterdam avenue to Edgecombe road.

One Hundred and Sixty-third street, from Courtlandt to Railroad avenue (R).

Dawson street, from Prospect to Westchester avenue.

One Hundred and Seventieth street, from Bristow street to Prospect avenue.

One Hundred and Eightieth street, from Third to Webster avenue.

One Hundred and Forty-second street, from Amsterdam to Convent avenue.

One Hundred and Seventy-eighth street, from Eleventh avenue to Kingsbridge road.

Home street, from Intervale avenue to Southern Boulevard (R).

Stebbins avenue, from One Hundred and Sixty-fifth to One Hundred and Sixty-seventh street.

One Hundred and Eightieth street, from Prospect to Mapes avenue.

Mapes avenue, from One Hundred and Eightieth street to a point 500 feet north.

Bryant street, from Jennings street to East One Hundred and Seventy-second street.

Franklin avenue, from One Hundred and Sixty-ninth street to a point 250 feet north (R)

Washington avenue, at intersection of One Hundred and Eighty-third street (R).

Bathgate avenue, at intersection of One Hundred and Eightieth street (R).

Wicker place, from Van Corlears place to Kingsbridge avenue (R).

Cauldwell avenue, from Westchester avenue to Boston road.

One Hundred and Thirty-sixth street, from St. Ann's avenue to Southern Boulevard.

Ninetieth street, from First avenue to Avenue A.

Convent avenue, from One Hundred and Thirty-fifth to One Hundred and Forty-first street.

One Hundred and Twenty-seventh street, from Boulevard to Claremont avenue.

Boulevard, from Manhattan to One Hundred and Twenty-second street.

Home street, at intersection of Longfellow street (R).

Andrews avenue, from Hampden street to a point 300 feet north (R).

Marcher avenue, from Boscobel avenue to a point 200 feet north (R).

Loring place, from One Hundred and Eighty-first street to One Hundred and Eighty-third street.

Vireo avenue, from Two Hundred and Thirty-third to Two Hundred and Thirty-fourth street (R).

Vireo avenue, from Two Hundred and Thirty-sixth to Two Hundred and Thirty-ninth street (R).

Keppler avenue, from Two Hundred and Thirty-third street to Two Hundred and Thirty-fifth street (R).

Travers street, from Decatur avenue to Pond place (R).

One Hundred and Twenty-fourth street, from Amsterdam avenue to Boulevard.

Franklin avenue, from Tremont avenue to Crotona Park, North (R).

Morris avenue, from One Hundred and Sixty-first to One Hundred and Sixty-fifth street (R).

Anthony avenue, from Tremont to Burnside avenue (R).

One Hundred and Thirty-seventh street, from St. Ann's avenue to Southern Boulevard (R).

6-inch pipe—

Bathgate avenue, from One Hundred and Eightieth street to One Hundred and Eighty-third street (R).

Woodruff street, from Boston road to Main street (R).

Willis avenue (east side), from Southern Boulevard to One Hundred and Thirty-fourth street.

### "A"—HYDRANTS PLACED DURING THE YEAR 1898.

| | |
|---|---|
| North side One Hundred and Sixty-third street, between Tinton and Union avenues | 1 |
| Northwest corner Union avenue and Home street | 1 |
| Southwest corner Union avenue and One Hundred and Sixty-eighth street | 1 |
| Northwest corner Union avenue and One Hundred and Sixty-eighth street | 1 |
| Southwest corner Union avenue and One Hundred and Sixty-ninth street | 1 |
| West side Webster avenue, north of Mosholu Parkway | 1 |
| Northwest corner Simpson and One Hundred and Sixty-seventh streets | 1 |
| Southwest corner Simpson and Home streets | 1 |
| Northwest corner Simpson and Home streets | 1 |
| Southwest corner Simpson and Freeman streets | 1 |
| Northwest corner One Hundred and Forty-first street and Brook avenue | 1 |
| Northwest corner One Hundred and Forty-first street and St. Ann's avenue | 1 |
| North side Southern Boulevard, between Perry and Bainbridge avenues | 1 |
| Northeast corner One Hundred and Sixty-third street and Amsterdam avenue | 1 |
| Northwest corner One Hundred and Sixty-third street and Edgecombe road | 1 |
| North side Dawson street, between Westchester and Tinton avenues | 1 |
| North side Dawson street, between Tinton and Union avenues | 1 |
| North side Dawson street, between Union and Prospect avenues | 1 |
| Northeast corner One Hundred and Seventieth street and Prospect avenue | 1 |
| Northwest corner One Hundred and Seventieth and Bristow streets | 1 |
| Northeast corner One Hundred and Forty-second street and Amsterdam avenue | 1 |
| Northwest corner One Hundred and Forty-second street and Convent avenue | 1 |
| Northeast corner One Hundred and Eightieth street and Webster avenue | 1 |
| Northwest corner One Hundred and Eightieth street and Park avenue | 1 |
| Northeast corner One Hundred and Eightieth street and Bathgate avenue | 1 |
| Northeast corner One Hundred and Seventy-eighth street and Kingsbridge road | 1 |
| Northwest corner One Hundred and Seventy-eighth street and Wadsworth avenue | 1 |
| Northwest corner One Hundred and Seventy-eighth street and Eleventh avenue | 1 |
| North side Home street, between Barretto and Simpson streets | 1 |
| West side Stebbins avenue, between One Hundred and Sixty-fifth and One Hundred and Sixty-sixth streets | 2 |
| North side One Hundred and Eightieth street, between Prospect and Mapes avenues | 1 |
| West side Mapes avenue, north of One Hundred and Eightieth street | 2 |

---

NOTE—(R) indicates streets and avenues in which mains have been relaid during the year to replace old mains abandoned on account of changes of grades of streets and construction of sewers

| | |
|---|---|
| West side Bryant street, north of Jennings street | 2 |
| Northwest corner Cauldwell and Westchester avenues | 1 |
| West side Cauldwell avenue, between Westchester avenue and One Hundred and Fifty-sixth street | 2 |
| Northwest corner Cauldwell avenue and One Hundred and Fifty-sixth street | 1 |
| West side Cauldwell avenue, between One Hundred and Fifty-sixth street and Cedar place | 1 |
| West side Cauldwell avenue, between Cedar place and One Hundred and Sixty-first street | 1 |
| Southwest corner Cauldwell aveuue and One Hundred and Sixty-first street | 1 |
| West side Cauldwell avenue, between One Hundred and Sixty-third street and Teasdale place | 1 |
| Southwest corner Cauldwell avenue and One Hundred and Sixty-fourth street | 1 |
| West side Cauldwell avenue, between One Hundred and Sixty-fourth and One Hundred and Sixty-fifth streets | 1 |
| Southwest corner Cauldwell avenue and Boston road | 1 |
| North side One Hundred and Thirty-sixth street, between St. Ann's and Cypress avenues | 2 |
| North side One Hundred and Thirty-sixth street, between Cypress avenue and Southern Boulevard | 1 |
| Northeast corner Ninetieth street and First avenue | 1 |
| Northwest corner Ninetieth street and Avenue A | 1 |
| Northwest corner One Hundred and Thirty-sixth street and Convent avenue | 1 |
| Northwest corner One Hundred and Thirty-seventh street and Convent avenue | 1 |
| Northwest corner One Hundred and Thirty-eighth street and Convent avenue | 1 |
| Northwest corner One Hundred and Thirty-ninth street and Convent avenue | 1 |
| Northwest corner One Hundred and Fortieth street and Convent avenue | 1 |
| Northwest corner Andrews avenue and Hampden street | 1 |
| Northwest corner Eleventh avenue and One Hundred and Ninetieth street | 1 |
| Southwest corner Eleventh and Wadsworth avenues | 1 |
| West side Eleventh avenue, north of Wadsworth avenue | 2 |
| Northwest corner Boulevard and One Hundred and Twenty-second street | 1 |
| Northwest corner Boulevard and One Hundred and Twenty-fourth street | 1 |
| Northwest corner Boulevard and One Hundred and Twenty-fifth street | 1 |
| Southwest corner Boulevard and Manhattan street | 1 |
| Northeast corner One Hundred and Twenty-seventh street and Claremont avenue | 1 |
| Southwest corner Loring place and One Hundred and Eighty-third street | 1 |
| Northwest corner Loring place and One Hundred and Eighty-first street | 1 |
| Northeast corner Burnside and Sedgwick avenues | 1 |
| North side Burnside avenue, between Osborne and Loring places | 1 |
| Northwest corner Burnside and Andrews avenues | 1 |
| North side Burnside avenue, between Andrews and Aqueduct avenues | 1 |
| West side Aqueduct avenue, north of Burnside avenue | 1 |
| North side Burnside avenue, between Harrison and Grand avenues | 1 |

| | |
|---|---|
| Northeast corner Burnside and Davidson avenues | 1 |
| Northwest corner One Hundred and Twenty-fourth street and Amsterdam avenue | 1 |
| North side One Hundred and Twenty-fourth street, between Amsterdam avenue and the Boulevard | 1 |
| Northeast corner One Hundred and Twenty-fourth street and Boulevard | 1 |
| | 79 |

### DOUBLE-NOZZLE "A" HYDRANTS PLACED DURING THE YEAR 1898.

| | |
|---|---|
| Northeast corner Amsterdam avenue and Fifty-eighth street | 1 |
| Northeast corner Amsterdam avenue and Fifty-ninth street | 1 |
| East side Amsterdam avenue, between Sixtieth and Sixty-first streets | 1 |
| East side Amsterdam avenue, between Sixty-first and Sixty-second streets | 1 |
| East side Amsterdam avenue, between Sixty-second and Sixty-third streets | 1 |
| East side Amsterdam avenue, between Sixty-third and Sixty-fourth streets | 1 |
| East side Amsterdam avenue, between Sixty-fourth and Sixty-fifth streets | 1 |
| East side Amsterdam avenue, between Sixty-fifth and Sixty-sixth streets | 1 |
| East side Amsterdam avenue, between Sixty-sixth and Sixty-seventh streets | 1 |
| East side Amsterdam avenue, between Sixty-seventh and Sixty-eighth streets | 1 |
| East side Amsterdam avenue, between Sixty-eighth and Sixty-ninth streets | 1 |
| Southeast corner Amsterdam avenue and Seventieth street | 1 |
| Southeast corner One Hundred and Twenty-fifth street and Lexington avenue | 1 |
| Southeast corner Park avenue and One Hundred and Twenty-fifth street | 1 |
| Northeast corner Tremont and Anthony avenues | 1 |
| | 15 |

### LAYING LARGE MAINS.

*Report for Quarter and Year ending December* 31, 1898.

Contracts for laying water-mains in the following streets and avenues have been completed during the quarter:

One Hundred and Seventy-ninth street, from Amsterdam avenue to Western Boulevard.

Eleventh avenue and Western Boulevard, from One Hundred and Seventy-ninth to Fifty-ninth street.

Elm street, from Bond to Chambers street.

### "NEW YORK" HYDRANTS PLACED DURING THE YEAR 1898.

| | |
|---|---|
| Northwest corner Great Jones and Bond streets | 1 |
| Southwest corner Vesey street and Broadway | 1 |
| Southwest corner Barclay street and Broadway | 1 |
| Southwest corner Park place and Broadway | 1 |
| Southwest corner Murray street and Broadway | 1 |
| Northwest corner Warren street and Broadway | 1 |
| Southwest corner Reade street and Broadway | 1 |
| South side Duane street, west of Broadway | 1 |

| | |
|---|---|
| Northwest corner Worth street and Broadway | 1 |
| South side Leonard street, west of Broadway | 1 |
| North side Franklin street, west of Broadway | 1 |
| North side White street, west of Broadway | 1 |
| Southwest corner Walker street and Broadway | 1 |
| East side Greene street, between West Third and Bleecker streets | 1 |
| East side Greene street, between Bleecker and West Houston streets | 1 |
| East side Greene street, between West Houston and Prince streets | 1 |
| West side Greene street, between Prince and Spring streets | 1 |
| East side Greene street, between Spring and Broome streets | 1 |
| East side Greene street, between Broome and Grand streets | 1 |
| West side Greene street, between Grand and Canal streets | 1 |
| Southwest corner Broadway and West Fourth street | 1 |
| East side West Broadway, between Franklin and Leonard streets | 1 |
| East side West Broadway, between Thomas and Duane streets | 1 |
| Intersection of West Broadway and Chambers street | 1 |
| West side West Broadway, between Chambers and Warren streets | 1 |
| East side West Broadway, between Warren and Murray streets | 1 |
| East side West Broadway, between Murray street and Park place | |
| West side West Broadway, between Park place and Barclay street | 1 |
| West side West Broadway, between Barclay and Vesey streets | 1 |
| East side West Broadway, between Vesey and Fulton streets | 1 |
| Southeast corner of One Hundred and Seventy-ninth street and Eleventh avenue | 1 |
| West side Eleventh avenue, between One Hundred and Seventy-sixth and One Hundred and Seventy-seventh streets | 1 |
| West side Eleventh avenue, between One Hundred and Seventy-second and One Hundred and Seventy-third streets | 1 |
| Southwest corner Eleventh avenue and One Hundred and Fifty-third street | 1 |
| Northwest corner Eleventh avenue and One Hundred and Fifty-third street | 1 |
| West side Western Boulevard, between One Hundred and Forty-seventh and One Hundred and Forty-eighth streets | 1 |
| Southwest corner Western Boulevard and One Hundred and Thirty-third street | 1 |
| West side Western Boulevard, between One Hundred and Seventeenth and One Hundred and Eighteenth streets | 1<br>1 |
| Southwest corner Western Boulevard and One Hundred and Thirteenth street | 1 |
| West side Western Boulevard, between One Hundred and Sixth and One Hundred and Seventh streets | 1 |
| Northwest corner Western Boulevard and Ninety-second street | 1 |
| Southwest corner Western Boulevard and Ninety-second street | 1 |
| Southwest corner Western Boulevard and Seventy-seventh street | 1 |
| Northwest corner Western Boulevard and Seventy-sixth street | 1 |
| Southwest corner Western Boulevard and Sixty-ninth street | 1 |
| Southwest corner Western Boulevard and Sixty-second street | 1 |

| | |
|---|---|
| Northeast corner Elm street and Jones Alley | 1 |
| Northeast corner Elm and Houston streets | 1 |
| Southeast corner Elm and Jersey streets | 1 |
| East side Elm street, between Prince and Spring streets | 1 |
| East side Elm street, near Marion street | 1 |
| East side Elm street, between Broome and Grand streets | 1 |
| Northeast corner Elm and Howard streets | 1 |
| West side Elm street, between Howard and Canal streets | 1 |
| Northeast corner Elm and Walker streets | 1 |
| Southeast corner Elm and Walker streets | 1 |
| West side Elm street, between Leonard and Franklin streets | 1 |
| Southeast corner Elm and White streets | 1 |
| Northeast corner Elm and Worth streets | 1 |
| Southeast corner Elm and Worth streets | 1 |
| East side Elm street, between Pearl and Duane streets | 1 |
| Northeast corner City Hall place and Chambers street | |
| | 62 |

This completes the work of laying large mains under chapter 669, Laws of 1896, and will for some years give an ample supply of water to the lower portions of the city.

There is required to be laid a 36-inch main in the Boulevard, from Ninety-second to Eighty-sixth street, through the Eighty-sixth street Transverse road, and Eighty-fifth street, between Boulevard and Third avenue, with the necessary branches, in order to fully supply the high service district east of Central Park, and a 48-inch main from the Aqueducts at Jerome Park Reservoir, through Mosholu parkway, Bronx Park and Southern Boulevard to One Hundred and Seventy-third street, in order to supply the lower portions of the Twenty-third and Twenty-fourth Wards, from the Croton Aqueduct, and when finished from Jerome Park Reservoir. Ordinances, etc., are now before the Municipal Assembly, having passed the Board of Public Improvements (under chapter 646, Laws of 1897), for erecting two 15-million-gallon pumping-engines in the engine-house, One Hundred and Seventy-ninth street, between Amsterdam avenue and Harlem river, and for constructing and equipping a new high service station at Jerome Park Reservoir.

### LAYING LARGE MAINS—AMOUNT OF PIPE LAID, STOP-COCKS SET AND HYDRANTS PLACED.

#### *Pipes.*

| Diameter of Pipe. | Lineal Feet Laid during Quarter ending December 31, 1898. | Lineal Feet Laid during Year 1898. |
|---|---|---|
| 36-inch | 7,592 | 41,019 |
| 20-inch | 2,628 | 7,682 |
| 12-inch | 491 | 5,511 |
| 6-inch | 1,065 | 2,631 |
| Totals | 11,776 | 56,843 |

### *Stop-cocks.*

| DIAMETER OF STOP-COCK. | SET DURING QUARTER ENDING DECEMBER 31, 1898. | SET DURING YEAR 1898. |
|---|---|---|
| 36-inch | 1 | 8 |
| 20-inch | 2 | 14 |
| 12-inch | 7 | 58 |
| 6-inch | 29 | 76 |
| Totals | 39 | 156 |

### *Hydrants.*

| PATTERN. | PLACED DURING QUARTER DECEMBER 31, 1898. | PLACED DURING YEAR 1898. |
|---|---|---|
| New York | 16 | 62 |

## SUMMARY—1898.

### *Pipes.*

| DIAMETER OF PIPE. | LINEAL FEET LAID TO DECEMBER 31, 1897. | LINEAL FEET LAID FROM DECEMBER 31, 1897, TO DECEMBER 31, 1898. | TOTAL LINEAL FEET LAID TO DECEMBER 31, 1898. |
|---|---|---|---|
| 48-inch | 138,781 | ...... | 138,781 |
| 36-inch | 181,382 | 43,154 | 224,536 |
| 30-inch | 43,510 | 18 | 43,528 |
| 24-inch | 11,542 | ...... | 11,542 |
| 20-inch | 232,774 | 7,774 | 240,548 |
| 16-inch | 17,130 | ...... | 17,130 |
| 12-inch | 1,012,202 | 17,294 | 1,029,496 |
| 10-inch | 6,629 | ...... | 6,629 |
| 6-inch | 2,608,693 | * 21,171 | 2,629,864 |
| 4-inch | 58,299 | 53 | 58,352 |
| Total | 4,310,942 | 89,464 | 4,400,406 |
| Miles | 816.47 | 16.94 | 833.41 |

---

* A deduction of 4,000 lineal feet 6-inch pipe was made from amount laid in 1898 on account of old pipe abandoned.

## *Stop-cocks.*

| DIAMETER OF STOP-COCK. | SET TO DECEMBER 31, 1897. | SET FROM DECEMBER 31, 1897, TO DECEMBER 31, 1898. | TOTAL SET TO DECEMBER 31, 1898. |
|---|---|---|---|
| 48-inch | 29 | .... | 29 |
| 36-inch | 58 | 9 | 67 |
| 30-inch | 31 | 1 | 32 |
| 24-inch | 13 | .... | 13 |
| 20-inch | 218 | 17 | 235 |
| 16-inch | 21 | 2 | 23 |
| 12-inch | 1,901 | 96 | 1,997 |
| 10-inch | 16 | 1 | 17 |
| 6-inch | 6,098 | 155 | * 6,243 |
| 4-inch | 146 | 2 | 148 |
| Totals | 8,531 | 283 | 8,804 |

* Less 10 six-inch stop-cocks abandoned.

## *Hydrants.*

| PATTERNS. | PLACED TO DECEMBER 31, 1897. | PLACED FROM DECEMBER 31, 1897, TO DECEMBER 31, 1898. | TOTAL PLACED TO DECEMBER 31, 1898. |
|---|---|---|---|
| Nos. 1, 2 and 3 | 3,682 | 13 | * 3,675 |
| Victor | 137 | .... | 137 |
| A | 4,204 | 79 | 4,283 |
| B | 1,780 | .... | 1,780 |
| Double Nozzle A | 449 | 29 | 478 |
| Double Nozzle New York | 726 | 123 | 849 |
| Miscellaneous | 24 | .... | 24 |
| Totals | 11,002 | 244 | 11,226 |

* Less 20 No. 1, 2 and 3 hydrants abandoned.

LAYING CROTON PIPES—AMOUNT OF PIPE LAID, STOP-COCKS SET AND HYDRANTS PLACED IN 1898.

*Pipes.*

| DIAMETER OF PIPE. | LINEAL FEET LAID DURING QUARTER ENDING DECEMBER 31, 1898. | LINEAL FEET LAID DURING YEAR 1898. |
|---|---|---|
| 36-inch | 600 | 2,034 |
| 20-inch | .... | 62 |
| 12-inch | .... | 9,521 |
| 6-inch | .... | 20,410 |
| 4-inch | .... | ...... |
| Totals | 600 | 32,027 |

*Stop-cocks.*

| DIAMETER OF STOP-COCK. | SET DURING QUARTER ENDING DECEMBER 31, 1898. | SET DURING YEAR 1898. |
|---|---|---|
| 36-inch | .... | 1 |
| 20-inch | .... | 1 |
| 12-inch | .... | 13 |
| 6-inch | .... | 47 |
| 4-inch | .... | .... |
| Totals | .... | 62 |

*Hydrants.*

| PATTERN. | PLACED DURING QUARTER ENDING DECEMBER 31, 1898. | PLACED DURING YEAR 1898. |
|---|---|---|
| New York "A" | .... | 79 |
| Double Nozzle "A" | .... | 15 |
| Totals | .... | 94 |

NOTE—In addition to the above, the following amount of pipes, stop-cocks and hydrants have been relaid and reset to replace an equal amount abandoned on account of changes of grades of streets and construction of sewers during year 1898 :

| | |
|---|---|
| 20-inch pipe, lineal feet | 76 |
| 12-inch pipe, lineal feet | 1,991 |
| 6-inch pipe, lineal feet | 9,320 |
| | 11,387 |

| | |
|---|---|
| 12-inch stop-cocks | 2 |
| 6-inch stop-cocks | 15 |
| | 17 |

| | |
|---|---|
| "A" hydrants | 22 |
| "A" nozzle "A" hydrants | 3 |
| | 25 |

*Water-mains Laid.*

| | Miles. | Total Miles. | | Miles. | Total Miles. |
|---|---|---|---|---|---|
| Previous to 1870 | ..... | 333.64 | 1885 | 17.02 | 595.02 |
| 1870 | 12.45 | 346.09 | 1886 | 24.53 | 619.55 |
| 1871 | 12.52 | 358.61 | 1887 | 15.43 | 634.98 |
| 1872 | 20.34 | 378.95 | 1888 | 18.38 | 653.36 |
| 1873 | 28.98 | 407.93 | 1889 | 18.93 | 672.29 |
| 1874 | 13.15 | 421.08 | 1890 | 10.51 | 682.80 |
| 1875 and 1876 | 19.38 | 440.46 | 1891 | 17.77 | 700.57 |
| 1877 | 15.00 | 455.46 | 1892 | 13.35 | 713.92 |
| 1878 | 23.31 | 478.77 | 1893 | 11.10 | 725.02 |
| 1879 | 16.03 | 494.80 | 1894 | 15.21 | 740.23 |
| 1880 | 23.37 | 518.17 | 1895 | 24.08 | 764.31 |
| 1881 | 8.96 | 527.13 | 1896 | 12.77 | 777.08 |
| 1882 | 19.60 | 546.73 | 1897 | 39.39 | 816.47 |
| 1883 | 16.88 | 563.61 | 1898 | 16.94 | 833.41 |
| 1884 | 14.39 | 578.00 | | 833.41 | |

REPAIRING AND RENEWAL OF PIPES, STOP-COCKS, ETC.

Seven gangs of men have been employed relaying mains, resetting small stop-cocks and hydrants, and making necessary repairs to mains, hydrants, stop-cocks, etc., etc., on small mains throughout the boroughs, and a force maintained at Pipe Yard, Twenty-fourth street, East river, and Receiving Piers Twenty-eighth and Twentieth streets, East river, to receive and deliver materials required for repair gangs and for contractors laying small mains, and a force of tappers to place the taps for which permits are given by the Water Register.

### *Work Done during Quarter.*

205 new hydrants set.
1,330 old hydrants repaired.
4 new stop-cocks set.
342 old stop-cocks repaired.
322 repairs to mains.
301 service-taps shut off.
222 hydrants found improperly closed.
890 taps placed.

### *Work Done during the Year* 1898.

801 new hydrants placed.
5,783 old hydrants repaired.
29 new stop-cocks set.
1,599 stop-cocks repaired.
1,172 repairs to mains.
1,163 taps shut off, service-pipes being found leaking.
835 hydrants found improperly closed.
3,711 taps placed.
32 lineal feet of 36-inch pipe laid, new.
30 lineal feet of 20-inch pipe laid, new.
72 lineal feet of 12-inch pipe laid, new.
836 lineal feet of 6-inch pipe laid, new.

The use of fire-hydrants by the employees of the Street Cleaning Department, by sprinklers, contractors, and by the railroad companies has become so excessive (these parties not knowing how to properly open or shut the hydrants), and the leaving of the hydrants open so that children can place stone, etc., etc., in same, that to properly protect the hydrants and keep them in order has become almost impracticable at any reasonable expense. In order to allow this to be done all permits to use hydrants, except by this Department and the Fire Department, was stopped on December 3, 1898, to continue to March 20, 1899, and I recommend that no more general permits be given for the use of hydrants, and only permits for use of specified hydrants be given, the parties obtaining same to pay for any repairs necessary to said hydrant during and after use, and the Street Cleaning Department should only allow the use of the hydrants by employees who thoroughly understand the use of fire-hydrants and who shall close same each time after being used.

The increase of pressures below Thirty-eighth street by the use of new mains on Fifth avenue has developed a large number of weak places in the old mains and in the service-pipes to houses and old disused taps and services, thus largely increasing the work of the repair gangs.

### *Mains Laid and Relaid in* 1898.

Franklin avenue, Tremont avenue to Crotona Park, North (R).
Morris avenue, One Hundred and Sixty-first to One Hundred and Sixty-fifth street (R).
Bathgate avenue, One Hundred and Eightieth to One Hundred and Eighty-third street (R).
Anthony avenue, Tremont to Burnside avenue (R).
Tremont avenue, Webster to Ryer avenue (R).
One Hundred and Thirty-seventh street, St. Ann's avenue to Southern Boulevard (R).

Woodruff street, Boston road to Main street (R).

Willis avenue (east side), Southern Boulevard to One Hundred and Thirty-fourth street.

Elm street, Great Jones to Spring street.

### *Double-nozzle "New York" Hydrants Placed during the Year* 1898.

| | |
|---|---|
| Northeast corner Seventy-fourth street and Fifth avenue | 1 |
| Northeast corner Thirty-fourth street and Second avenue | 1 |
| Northeast corner Second avenue and Twenty-seventh street | 1 |
| Southwest corner First avenue and Nineteenth street | 1 |
| Southwest corner First avenue and Eighteenth street | 1 |
| Northwest corner Avenue C and Tenth street | 1 |
| Northwest corner Avenue C and Eleventh street | 1 |
| Southwest corner Tenth street and Avenue D | 1 |
| Southeast corner Avenue B and Eleventh street | 1 |
| Northwest corner Avenue B and Eleventh street | 1 |
| Southeast corner Avenue B and Thirteenth street | 1 |
| Southeast corner Avenue B and Sixth street | 1 |
| Southeast corner Avenue B and Fourth street | 1 |
| Northwest corner Avenue B and Second street | 1 |
| West side Avenue A, between First and Second streets | 1 |
| Southwest corner Avenue A and Tenth street | 1 |
| Northeast corner Forty-ninth street and Second avenue | 1 |
| Northeast corner Forty-eighth street and Second avenue | 1 |
| Northwest corner Fiftieth street and Second avenue | 1 |
| Northeast corner Fiftieth street and Third avenue | 1 |
| Northeast corner Fifty-second street and Second avenue | 1 |
| Northwest corner Fifth-first street and Second avenue | 1 |
| South side Fifty-third street, between First and Second avenues | 1 |
| North side Fifty-fourth street, between First and Second avenues | 1 |
| Northeast corner Fifty-sixth street and Second avenue | 1 |
| Northeast corner Fifty-fifth street and Second avenue | 1 |
| Northeast corner Fifty-seventh street and Second avenue | 1 |
| North side Fifty-fourth street, between Second and Third avenues | 1 |
| Northwest corner Fiftieth street and Third avenue | 1 |
| Northwest corner Jefferson street and East Broadway | 1 |
| Northwest corner Division and Suffolk streets | 1 |
| Northwest corner Division and Norfolk streets | 1 |
| Northeast corner Essex and Division streets | 1 |
| North side East Broadway, between Jefferson and Rutgers streets | 1 |
| North side Thirty-first street, between Madison and Fifth avenues | 1 |
| East side Wooster street, between Bleecker and West Third streets | 1 |

---

NOTE.—(R) indicates streets and avenues in which mains have been relaid during the quarter to replace old mains abandoned on account of changes of grade of streets and construction of sewers.

| | |
|---|---|
| Northwest corner Forty-fifth street and Vanderbilt avenue | 1 |
| Southeast corner John and Nassau streets | 1 |
| Northeast corner John and Dutch streets | 1 |
| Southwest corner William and John streets | 1 |
| Northwest corner Platt and Gold streets | 1 |
| Northeast corner Pearl and Beekman streets | 1 |
| Northeast corner Maiden lane and Pearl street | 1 |
| East side Water street, between Fletcher and John streets | 1 |
| Northeast corner Front and Depuyster streets | 1 |
| Northwest corner Front and Wall streets | 1 |
| North side Forty-third street, between Fifth and Sixth avenues | 1 |
| Southwest corner Front and Wall streets | 1 |
| Southeast corner Wall and Front streets | 1 |
| Northeast corner Wall and Water streets | 1 |
| West side Water street, between Maiden lane and Pine street | 1 |
| East side Water street, between Coenties and Old slips | 1 |
| East side Water street, between Gouverneur's lane and Wall street | 1 |
| East side Water street, between Coenties slip ahd Broad street | 1 |
| West side Pearl street, opposite Coenties slip | 1 |
| South side Forty-second street, between Seventh and Eighth avenues | 1 |
| West side Pearl street, between Pine and Wall streets | 1 |
| North side Thirty-sixth street, between Madison and Fifth avenues | 1 |
| Southwest corner Forty-second street and Eighth avenue | 1 |
| South side One Hundred and Seventieth street, between Amsterdam and Audubon avenues | 1 |
| East side Forest avenue, between One Hundred and Sixty-first and One Hundred and Sixty-third streets | 1 |
| | 61 |

### *Double-nozzle "A" Hydrants Placed during the Year* 1898.

| | |
|---|---|
| Northeast corner One Hundred and Forty-first street and Walnut avenue | 1 |
| Northwest corner Webster avenue and Two Hundred and Thirty-third street | 1 |
| West side Morris avenue, between One Hundred and Sixty-first and One Hundred and Sixty-second streets | 1 |
| West side Morris avenue, between One Hundred and Sixty-second and One Hundred and Sixty-third streets | 1 |
| East side Anthony avenue, between Berry and Bush streets | 1 |
| West side Tremont avenue, betwee Carter and Ryer avenues | 1 |
| Northwest corner Bathgate avenue and One Hundred and Eighty-first street | 1 |
| Southwest corner Bathgate avenue and One Hundred and Eighty-third street | 1 |
| Northwest corner Elm and Bond streets | 1 |

| | |
|---|---|
| Southwest corner Elm and Houston streets | 1 |
| West side Elm street, between Prince and Spring streets | 1 |
| | 11 |

### *Nos.* 1, 2 *and* 3 *Hydrants Placed during the Year* 1898.

| | |
|---|---|
| South side Fifty-sixth street, between Eleventh and Twelfth avenues | 1 |
| Northwest corner Broadway and Forty-second street | 1 |
| Intersection of Boulevard and Sixty-second street | 1 |
| Southeast corner Maiden lane and Front street | 1 |
| Northeast corner Amsterdam avenue and One Hundred and Seventy-fourth street | 1 |
| Northwest corner Coenties slip and Water street | 1 |
| Northeast corner Coenties slip and Water street | 1 |
| Northeast corner Front street and Old slip | 1 |
| Northwest corner Front street and Coenties slip | 1 |
| West side Water street, between Broad and Moore streets | 1 |
| Intersection of Forty-third street and Prospect place | 1 |
| East side Ogden avenue, between Devoe and Union streets | 1 |
| East side Webster avenue south of Kingsbridge road | 1 |
| | 13 |

### PRIVATE WATER COMPANIES, BOROUGH OF THE BRONX.

The Borough of The Bronx, east of the Bronx river, is supplied with water by the New York and Westchester Water Company, who have about 500 hydrants on their mains. They have an old cross-compound pumping engine in Yonkers, supplying the upper portion of this district by a 20-inch main across Bronx river, capacity 1,500,000 gallons per day, when in order, supplied by water from the Bronx river conduit. Also, a pumping station in South Mount Vernon, Pelham, capacity one million gallons a day, supplied by driven wells and Hutchinson's creek. One of the pumping plants is in very bad order, and not able and does not supply over one-half its actual capacity. They do not keep their hydrants in order, and very seldom have a pressure sufficient to fully supply the houses in the district.

### *The New York and Westchester Water Company.*

Number of Pumping Stations—Two; one located at Glen Hill, Yonkers, and one at Pelham.

Number of Pumping Engines—Three; one at Glen Hill and two at Pelham (but only one in use).

Water Pressure at Engine-house—At Glen Hill, 60 pounds; at Pelham, 100 pounds.

The engine at Glen Hill station is badly in need of repairs.

The engine at Pelham is in a fair condition, but the building very poorly constructed, roof very leaky.

Number of Boilers—Two; one at Pelham and one at Glen Hill—(horizontal tubular).

Pressure—75 pounds at Glen Hill ; 90 pounds at Pelham.

Steam Carried—At Pelham, 70—75 pounds ; at Glen Hill, 50—60 pounds.

Number of Stand Pipes—One at Glen Hill; height about 100 feet, diameter about 21 feet.

Number of Reservoirs—One at Glen Hill.

Number of Miles of Pipes, viz.:

| | |
|---|---|
| 4-inch pipe | 14.98 miles. |
| 6-inch " | 9.24 " |
| 8-inch " | 9.78 " |
| 10-inch " | 4.64 " |
| 12-inch " | 5.45 " |
| 14-inch " | 0.29 " |
| 16-inch " | 1.48 " |
| 20-inch " | 1.05 " |
| Total | 46.91 miles. |

Number of Hydrants in Order—439, and 14 additional on Hart's Island.

Number of Stop-cocks, etc.—This could not be ascertained.

Number of Wells—Twelve; 90 feet deep, at Pelham.

The City has not at present any mains near this district that will supply the higher portions of same and the mains near the lower portions are now used to their full capacity in supplying the other portion of the Borough of The Bronx.

The High Service Station at Jerome Park and the 48-inch main from Aqueduct at Mosholu avenue I recommend in a former portion of this report as being necessary will, when completed allow the laying of mains and supplying water to this district east of The Bronx.

The contracts of the New York and Westchester Water Company for the supply of water to the several districts expire in 1905.

As soon as the Pumping Station at Jerome Park and the 48-inch main is completed in 1900 it will have to be decided whether the City shall lay its water mains in this district or buy those belonging to the private water company.

### WASTE AND USE OF WATER.

The use of water has gradually decreased from the excessive use during the summer so that the use was normal during October and November. The cold weather in December started the waste of water to keep service pipes from freezing, this reduced pressures, especially in High Service District and in the Twenty-fourth Ward where the supply is limited.

| | Gallons. |
|---|---|
| October, Croton watershed | 235,000,000 |
| October, Bronx and Byram watersheds | 19,000,000 |
| Total | 254,000,000 |
| November, Croton watershed | 227,000,000 |
| November, Bronx and Byram watersheds | 18,000,000 |
| Total | 245,000,000 |
| December, Croton watershed | 225,000,000 |
| December, Bronx and Byram watersheds | 19,000,000 |
| Total | 244,000,000 |

Average daily use in 1898, gallons........................................ 243,000,000

Amount run over Croton Dam to waste during the year 1898, 109,476,000.000 gallons.

*Average Daily Supply and Consumption of Water and Amount of Stored Water Drawn Each Year and Rainfall Each Year.*

| | Gallons per Capita Used. | Millions Gallons Used. | Millions Gallons Storage Used. | Rainfall. |
|---|---|---|---|---|
| 1870 | 72 | 17 | 1.668 | 44.63 |
| 1871 | 72 | 79 | ..... | 48.94 |
| 1872 | 74 | 81 | ..... | 40.74 |
| 1873 | 74 | 88 | 2.724 | 43.87 |
| 1874 | 76 | 92 | 1.968 | 42.37 |
| 1875 | 77 | 95 | .580 | 43.66 |
| 1876 | 74 | 90 | 6.173 | 40.68 |
| 1877 | 74 | 89 | 4.344 | 46.03 |
| 1878 | 77 | 93 | 1.251 | 54.14 |
| 1879 | 77 | 93 | 1.257 | 46.08 |
| 1880 | 77 | 93 | 9.024 | 38.52 |
| 1881 | 77 | 94 | 6.710 | 46.33 |
| 1882 | 78 | 94 | 4.120 | 55.20 |
| 1883 | 76 | 94 | 4.970 | 43.15 |
| 1884 | 79 | 97 | 2.740 | 53.71 |
| 1885 | 84 | 105 | 6.470 | 45.99 |
| 1886 | 85 | 109 | 5.990 | 47.59 |
| 1887 | 86 | 109 | .310 | 61.63 |
| 1888 | 86 | 113 | 1.775 | 63.51 |
| 1889 | 84 | 114 | ..... | 54.50 |
| 1890 | 90 | 145 | 2.720 | 54.44 |
| 1891 | 91 | 165 | 17.120 | 48.21 |
| 1892 | 90 | 162 | 11.630 | 45.37 |
| 1893 | 93 | 174 | 12.455 | 57.83 |
| 1894 | 95 | 183 | 12.710 | 46.96 |
| 1895 | 96 | 189 | 23.490 | 38.33 |
| 1896 | 110 | 220 | 22.145 | 48.10 |
| 1897 | 112 | 226 | 10.140 | 57.48 |
| 1898 | 121 | 243 | 8.630 | 56.48 |

### AMOUNT EXPENDED

*By the Water Commission of* 1837, *the Croton Aqueduct Department, the Department of Public Works, the Department of Water Supply and the Aqueduct Commission for the Boroughs of Manhattan and The Bronx to December* 31, 1898.

| | |
|---|---|
| Aqueduct Commission for New Aqueduct reservoirs, lands, etc | $38,036,519 29 |
| Aqueduct and conduits | 16,731,845 88 |
| For water-mains, etc | 18,957,643 14 |
| For storage reservoirs, etc | 5,160,204 46 |
| For changing aqueduct between Eighty-sixth and One Hundred and Thirty-fourth streets, and laying pipes in place of same | 4,905,402 12 |
| For sanitary protection | 2,445,015 86 |
| Total amount expended | $86,236,630 75 |

The Old Aqueduct, between Eighty sixth and Ninety-third streets, was removed and pipes substituted in 1868. The Old Aqueduct, between Ninety-third and One Hundred and Thirteenth streets, in 1873.

### BOROUGH OF BROOKLYN.

| | | |
|---|---|---|
| "Water Supply, Maintenance and Repairs—Salaries and Wages" | $107,921 65 | |
| "Water Supply, Maintenance and Repairs—Materials and Supplies". | 53,676 79 | |
| "Water Supply, Distribution and Repairs—Salaries and Wages" | 46,119 81 | |
| "Water Supply, Distribution—Materials and Supplies" | 6,755 96 | $214,474 21 |
| "Salaries—Chief Engineer's Office" | $2,071 49 | |
| "Contingencies—Chief Engineer's Office" | 583 14 | |
| "Salaries—Laboratory" | 1,260 09 | |
| "Contingencies—Laboratory" | 211 40 | 4,126 12 |
| "Water Maintenance," 1897 | | 2,849 68 |
| "Water Construction" | | 562 90 |
| | | $222,012 91 |

### EXPENDITURES DURING THE YEAR 1898.

| | | |
|---|---|---|
| "Water Supply, Maintenance and Repairs—Salaries and Wages" | $411,124 22 | |
| "Water Supply, Maintenance and Repairs—Materials and Supplies". | 215,010 25 | |
| "Water Supply, Distribution and Repairs—Salaries and Wages" | 168,589 57 | |
| "Water Supply, Distribution—Materials and Supplies" | 12,529 08 | $807,253 12 |
| "Salaries—Chief Engineer's Office" | 7,270 84 | |
| "Contingencies—Chief Engineer's Office". | 869 75 | |
| "Salaries—Laboratory" | 4,620 01 | |
| "Contingencies—Laboratory" | 870 95 | 13,631 55 |
| "Water Maintenance," 1897 | | 17,063 20 |
| "Water Construction" | | 100,561 34 |
| | | $938,509 21 |

## LIST OF PENDING CONTRACTS.

| NAME OF CONTRACTOR AND DESCRIPTION OF WORK. | DATE OF CONTRACT. | CERTIFIED FOR | AMOUNT FOR WHICH ESTIMATES WERE RENDERED BY ENGINEER DURING 1898. | TOTAL AMOUNT FOR WHICH ESTIMATES WERE RENDERED BY ENGINEER UP TO DEC. 31, 1898. |
|---|---|---|---|---|
| W. T. Rainey & Co.—Furnishing semi-bituminous coal to various pumping stations | Sept. 5, 1898. | $97,057 00 | $17,133 62 | $17,133 62 |
| A. M. Wittenberg—For furnishing anthracite pea coal to various pumping stations | Nov. 11, 1898. | 74,686 00 | 5,809 44 | 5,809 44 |
| Henry R. Worthington—Remodeling Ridgewood engines and buildings, Section I and Section II | Nov. 20, 1895. | 390,000 00 | 4,400 00 | 216,400 00 |
| Charles Hart—Diversion of Hempstead stream | Mar. 20, 1897. | 100,000 00 | 61,639 76 | 61,639 78 |
| M. J. Dady—By-pass around Ridgewood reservoir | July 19, 1897. | 65,000 00 | 14,472 96 | * 52,883 00 |
| M. T. Davidson—Constructing a pumping engine at Mt. Prospect pumping station | Aug. 31, 1897. | 9,500 00 | 2,460 00 | † 8,550 00 |

## AVERAGE DAILY CONSUMPTION, UNITED STATES, GALLONS.

| SYSTEM. | OCTOBER. | NOVEMBER. | DECEMBER. | THREE MONTHS. |
|---|---|---|---|---|
| Ridgewood Supply— | | | | |
| Ridgewood Low Service | 83,262,982 | 80,728,294 | 83,628,758 | 82,559,704 |
| Mount Prospect Low Service | 4,431,452 | 4,232,301 | 4,331,020 | 4,332,670 |
| Mount Prospect High Service | 2,862,064 | 2,820,800 | 2,817,710 | 2,833,663 |
| Total, Ridgewood | 90,556,498 | 87,781,395 | 90,777,488 | 89,726,037 |
| Gravesend | 2,083,490 | 1,563,457 | 1,587,774 | 1,746,879 |
| New Utrecht | 1,629,858 | 924,937 | 942,961 | 1,168,538 |
| Total | 94,269,846 | 90,269,789 | 93,308,223 | 92,641,454 |

## DEPTH OF RESERVOIRS, IN FEET.

| RESERVOIR. | OCT. 1, 1898. | JAN. 1, 1899. | GAIN. | LOSS. |
|---|---|---|---|---|
| Ridgewood Basin No. 1 | 18.03 | 19.62 | 1.59 | ..... |
| Ridgewood Basin No. 2 | 17.62 | ..... | .... | 17.62 |
| Ridgewood Basin No. 3 | 16.43 | 18.28 | 1.85 | ..... |
| Mount Prospect | 21.51 | 20.60 | .... | 0.91 |
| Hempstead | 16.50 | 4.58 | .... | 11.92 |

* Five per cent. retained $2,783.32; final estimate tendered of $55,666.32.

† Ten per cent. retained $950; final estimate rendered of $9,500; $1,108.90 is due on this contract in excess of certification for premium on excess duty.

### AVERAGE DAILY CONSUMPTION IN 1898.

| | Gallons. |
|---|---|
| Ridgewood Supply— | |
| Ridgewood Low Service | 82,937,213 |
| Mount Prospect Low Service | 4,481,402 |
| Mount Prospect High Service | 2,635,888 |
| Total, Ridgewood | 90,054,503 |
| Gravesend | 2,064,615 |
| New Utrecht | 1,454,382 |
| | 93,573,500 |

### RAINFALL, 1898.

| | |
|---|---|
| Municipal Building | 47.88 |
| Hempstead Storage Reservoir | 51.22 |

The total storage at Ridgewood and Mount Prospect on October 1, 1898, was 274,096,269 United States gallons, while on December 31, 1898, it had decreased to 222,574,070 United States gallons, the loss being due to the fact that Ridgewood Basin No. 2 was emptied in October, preparatory to cleaning.

The water in the Hempstead Storage Reservoir remained at a fairly constant elevation from October 1 to November 15, when the gates were opened and the water rapidly drawn off to permit the resumption of pipe-laying on the contract for the diversion of Hempstead stream. On December 12, the date of resuming work, the water stood at a depth of seven feet, only six inches higher than the depth required by the contract, but in order to facilitate the work of pipe-laying it was further reduced to four feet seven inches.

### RAINFALL.

The rainfall in inches as observed at this office in the Municipal Building and at the Storage Reservoir at Hempstead during the quarter was as follows:

| LOCATION. | OCTOBER. | NOVEMBER. | DECEMBER. | TOTAL. |
|---|---|---|---|---|
| Municipal Building | 5.75 | 6.52 | 2.93 | 15.20 |
| Hempstead Reservoir | 5.81 | 6.00 | 2.36 | 14.17 |

This indicates 4.95 inches more at the Municipal Building and 1.47 inches more at the Hempstead Reservoir than in the preceding quarter.

### ANALYSES.

The work done at the Mount Prospect Laboratory during the quarter was as follows:

#### *Water Samples.*

493 samples received, 457 physical examinations, 301 chemical analyses, 23 partial chemical analyses, 453 microscopical examinations, 459 bacteriological examinations and 61 special bacterial examinations.

### *Miscellaneous.*

Analyses of coal, castor oil, boiler compounds and sediment from Ridgewood Basin No. 2, and examination of deposit in distribution pipes. Also inspections of water works at Far Rockaway, Jamaica, Woodhaven, Flushing, College Point and Whitestone.

## DISTRIBUTION SYSTEM.

During the quarter 826 feet of 6-inch pipe were laid, and three 6-inch, one 8-inch and two 20-inch water-gates were set, also two fire-hydrants ; two 6-inch gates were replaced by new ones ; 67 new meters were set and 30 accounts were closed, the total number of meters in use January 1, 1899, being 2,705. The length of pipe of each size and the number of gates and fire-hydrants in use on October 1, 1898, and all additions to the same during this quarter, as well as the number of repairs and leaks, are shown in the annexed tables :

### *Leaks in Distribution.*

| | 1898. | | | |
|---|---|---|---|---|
| | Oct. | Nov. | Dec. | Total. |
| 4-inch | .. | .. | .. | .. |
| 6-inch | 1 | 3 | 3 | 7 |
| 8-inch | 1 | .. | .. | 1 |
| 10-inch | .. | .. | .. | .. |
| 12-inch | .. | .. | .. | .. |
| 20-inch | 4 | 2 | 3 | 9 |
| 48-inch | .. | .. | 1 | 1 |
| | 6 | 5 | 7 | 18 |
| Drinking hydrants repaired | 22 | 26 | 26 | 74 |
| Fire-hydrants repaired | 270 | 185 | 203 | 658 |
| Leaks reported by Inspectors | 17 | 14 | 19 | 50 |
| Premises cut off | 9 | 10 | 4 | 23 |
| Taps inspected | 272 | 227 | 103 | 602 |
| Complaints of violations | 16 | 15 | 31 | 62 |
| Permits for extension | 78 | 71 | 77 | 226 |
| Permits for old and new buildings | 231 | 126 | 60 | 417 |
| Permits to cement sidewalks, etc | 102 | 82 | 8 | 192 |
| Stop-cocks repaired | 10 | 16 | 5 | 31 |
| Street opening permits | 491 | 296 | 161 | 948 |
| Special and temporary taps | 1 | 1 | 3 | 5 |
| Accommodation permits | 36 | 21 | 1 | 70 |
| Draw, tap and plug permits | 9 | 1 | 1 | 11 |
| Special water permits | 14 | 6 | 6 | 26 |
| Citizens' complaints attended to | 30 | 68 | 50 | 148 |

### *Distribution Mains Laid*

| | 4-INCH. | 6-INCH. | 8-INCH. |
|---|---|---|---|
| | Feet. | Feet. | Feet. |
| Ridgewood system, to October 1, 1898 | 3,871 | 1,648,824 | 561,855 |
| Gravesend system, to October 1, 1898 | 5,550 | 35,432 | 18,235 |
| New Utrecht system, to October 1, 1898 | 43,884 | 34,494 | 22,538 |
| Total feet laid to October 1 | 53,305 | 1,718,750 | 602,628 |
| Deduct pipe taken up | ........ | 4,746 | 2,733 |
| Total feet | 53,305 | 1,714,004 | 599,895 |
| Ridgewood system, laid between October 1, 1898, and January 1, 1899 | ........ | 826 | ........ |
| Gravesend system, laid between October 1, 1898, and January 1, 1899 | ........ | ........ | ........ |
| New Utrecht system, laid between October 1, 1898, and January 1, 1899 | ........ | ........ | ........ |
| Total feet laid to January 1, 1899 | 53,305 | 1,714,830 | 599,895 |
| Total miles | 10,096 | 324,778 | 113,617 |

### *Water Gates and Hydrants*

| | 4-INCH. | 6-INCH. | 8-INCH. |
|---|---|---|---|
| Ridgewood System, to October 1, 1898 | 18 | 2,952 | 945 |
| Gravesend System, to October 1, 1898 | 12 | 52 | 15 |
| New Utrecht System, to October 1, 1898 | 48 | 23 | 14 |
| Ridgewood System, between October 1, 1898, and January 1, 1899 | .... | 3 | 1 |
| Gravesend System, between October 1, 1898, and January 1, 1899 | .... | .... | .... |
| New Utrecht System, between October 1, 1898, and January 1, 1899 | .... | .... | .... |
| Total | 78 | 3,030 | 975 |

*to January* 1, 1899.

| 10-INCH. | 12-INCH. | 14-INCH. | 16-INCH. | 20-INCH. | 30-INCH. | 36-INCH. | 48-INCH. | TOTAL MILES. |
|---|---|---|---|---|---|---|---|---|
| Feet. | Feet. | Feet. | Feet. | Feet. | Feet. | Feet. | Feet. | |
| ........ | 259.660 | ........ | 30,345 | 137,064 | 49,869 | 54,616 | 99,970 | 539,039 |
| ........ | 25,685 | ........ | 5,100 | ........ | ........ | ........ | ....... | 17,045 |
| 19,601 | 2,342 | 3,159 | 265 | ........ | ........ | ........ | ....... | 23,917 |
| 19,601 | 287,687 | 3,159 | 35,710 | 137,064 | 49,869 | 54,616 | 99,970 | 579,992 |
| ........ | 1,572 | ........ | ........ | ... .... | ........ | ........ | ....... | 1,714 |
| 19,601 | 286,115 | 3,159 | 35,710 | 137,064 | 49,869 | 54,616 | 99,970 | 578,278 |
| ........ | .... ... | ........ | ........ | ........ | ........ | ........ | ....... | 156 |
| ........ | ........ | ........ | ........ | ........ | ........ | ........ | ....... | ........ |
| ........ | ........ | ........ | ........ | ........ | ........ | ........ | ....... | ........ |
| 19,610 | 286,115 | 3,159 | 35,710 | 137,064 | 49,869 | 54,616 | 99,970 | ........ |
| 3,712 | 54,188 | 598 | 6,763 | 25,959 | 9,445 | 10,344 | 18,934 | 578,434 |

*Set to January* 1, 1899.

| 10-INCH. | 12-INCH. | 14-INCH. | 16-INCH. | 20-INCH. | 30-INCH. | 36-INCH. | 48-INCH. | HYDRANTS. |
|---|---|---|---|---|---|---|---|---|
| .... | 429 | .... | 7 | 180 | 29 | 17 | 17 | 5,984 |
| .... | 11 | .... | 2 | .... | .... | .... | .... | 144 |
| 7 | 1 | 1 | .... | .... | .... | .... | .... | 16 |
| .... | .... | .... | .... | 2 | .... | .... | .... | 2 |
| .... | .... | .... | .... | .... | .... | .... | .... | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | .... |
| 7 | 441 | 1 | 9 | 182 | 29 | 17 | 17 | 6,146 |

### *Break at Central Avenue and Covert Street.*

Between 4 and 5 o'clock in the morning of December 11, 1898, a break occurred at Central avenue and Covert street on the 48-inch main leading from Basin No. 3 of the Ridgewood Reservoir, causing considerable damage to the buildings in the immediate vicinity, as well as to the car tracks and the sewer in Central avenue, and for a short time somewhat affecting the general supply of portions of the city. The repair gang arrived at the scene of the break about 6.30 A. M., and at once closed the 48-inch and 30-inch gates at the corner of Broadway and Willoughby avenue, to prevent any water backing through the break. A 48-inch gate between Covert street and the reservoir was closed as soon as possible, as well as the gates on the 8-inch main in Central avenue and the connecting 6-inch main in Covert street. The blow-off on 48-inch main was then opened at Central and Myrtle avenues, and the gate on the 48-inch main at Van Voorhis street, immediately above the break, was closed. One of the most serious features of the break was the cutting off of the supply from the Mount Prospect engines ; this was re-established when the 48-inch and 30-inch gates at Willoughby avenue and Broadway were closed. Repairs were completed at 4 P. M. on December 14, and the 48-inch main slowly filled.

The quantity of earth and the material carried away by this break and the amount of work to be done in refilling, repairing sewers, etc., and replacing pavements, sidewalks, etc., was so great that in the emergency to prevent, as far as possible, suits for damages, Harris & McGuire, contractors, were employed to do the necessary work (working night and day), to be paid their actual expenses for labor, teams and material and 10 per cent. added for the superintendence, etc. The amount so expended was $7,147.93.

### *Conduits and Force-mains.*

No change has been made during this quarter in the force-mains and conduits required to deliver the supply to the reservoirs and distribution system.

## RIDGEWOOD PUMPING STATION.

During the quarter the foundation of New Engine No. 3 was completed, the underpinning of the old foundation by the new was very carefully performed, the last stones being wedged up with steel wedges and grouted with liquid cement.

The work of erection of the new engine began early in December, and now the water ends, main columns and low-pressure cylinders have been erected and the engine has been lined up. The grouting under the feet of the main columns has also been completed. The retubing of condensers Nos. 1 and 2 has been done by the contractors, and also the facing of the foot-valves with brass. The boilers have been in regular operation during the entire quarter.

## RIDGEWOOD RESERVOIR.

The registers for the four Venturi meters have been set in place in the Register House and connected by ½-inch pipes with the meters. Also the wires to connect said registers with secondary registers at the Ridgewood Engine-house have been put up, but connections are not yet made. Rabbets for a double set of screens have been cut in the efflux chamber of Basin No. 2, none having been provided in the original construction.

### *Cleaning Basin No. 2 at Ridgewood Reservoir.*

On October 6 the inlet of Basin No. 2 was closed and the water let into the distribution system. On October 24 as much had been let into the distribution system as was practicable, and the remainder was pumped out. The mud left on the bottom was quite soft and fluid, and averaged about six inches in depth. An inclined roadway was built and the mud removed in carts and deposited beyond the south of the reservoir, the work being done by city laborers. The cleaning has been completed, about 10,000 yards having been removed at a cost of $6,018.28.

### HEMPSTEAD BY-PASS.

Work on this contract was resumed by the contractor on December 12, the water in the storage reservoir being at the depth required by contract on December 13. The first pipe was laid on December 19, commencing at Station 59 + 88, and on December 31 the line reached Station 65 + 63. About 3,950 feet of the pipe are yet to be laid.

### ELECTRIC WORK AT MOUNT PROSPECT AND MILLBURN.

Plans have been made and requisitions drawn for remodeling the electric-lighting installation at the Mount Prospect Engine-house. The present engine and dynamo will be removed to Millburn and a new and larger unit erected at Mount Prospect. The arc-lights now around the Mount Prospect Reservoir, for which the city pays a rental of $625 per annum, will be removed and new ones, to be operated from the engine-house, erected. The new installation also necessitates a new switch-board and some changes in steam-fitting and wiring.

Plans and specifications have also been prepared for erecting the above dynamo and engine at the Millburn Pumping Station and doing the necessary wiring.

### DRIVEN-WELL STATIONS.

At Jameco work on cleaning and repairing the 8-inch wells has continued, six wells having been pulled, cleaned, redriven and reconnected.

At Oconee six 8-inch wells have been pulled, cleaned, redriven and reconnected.

At Shetucket the 8-inch wells have been disconnected and sounded; were found clean on inside, but obstructed on the outside. Work has begun on removing the outside obstruction.

At Springfield 8-inch well No. 20 was connected and the ground at Nos. 19 and 20 cleaned and graded.

At Watts Pond Pumping Station the 8-inch test well was carried from a depth of 302 to 331 feet, when the pipe broke and further progress was prevented. Water was found at this depth, but not enough to pump.

At New Utrecht, 11 of the 13 six-inch wells have been repaired and connected; two are unconnected on account of non-delivery of material required for repairs.

### RIDGEWOOD AND LINE PUMPING STATIONS.

All the pumping stations on the old watershed have been in practically constant operation during the entire quarter, a few shut-downs being made on account of repairs or to enable the storage reservoir to be drawn down more rapidly. On the new watershed two of the Edwards Stations were run in October and part of November.

The pumping machinery has been overhauled and repaired as required, the work being done, as usual, either by the Engineer in charge, or by machinists from Ridgewood.

The cost of repairs for the quarter, as made by the city employees, exclusive of Mount Prospect, Gravesend, and New Utrecht Stations, was as follows:

| | |
|---|---|
| Labor | $4,750 07 |
| Materials | 1,999 65 |

Repairs to buildings, including engine-houses and dwellings along the water works line, have been made by city employees.

### MISCELLANEOUS.

Changes have been made in plans and specifications for 66-inch steel pipe line; plans and specifications are being made for a coal-shed, tool-house, and steel standpipe at Millburn, and for a third force-main from the Mount Prospect Engine-house to the reservoir, and for a steel stack at Mount Prospect; plans are being made for an Engineer's house at Millburn, filter beds at Jameco, and new engines and boilers at Mount Prospect and Gravesend.

### CONDUITS AND RESERVOIRS.

Three hundred and fifty panned closets along the conduit line and supply streams have been cleaned regularly each week, except week ending December 7, when the roads were impassable on account of the heavy snow. A general overhauling of the closets in the Village of Hempstead has been begun, and the general work of maintenance and repairs connected with this Bureau has been continued. New fences have been built, old ones reset, monuments set, and on conduit line east of Millburn work is progressing on cutting and burning brush, weeds, etc.

The following recommendations were presented to the Board of Estimate and Apportionment for the issue of bonds to the amount of $1,500,000 to provide for the absolutely necessary work to increase the water supply of the Borough of Brooklyn from its present sources of supply:

In the Borough of Brooklyn this Department is now forced by the necessities of the city to endanger the old masonry conduit from Hempstead to Ridgewood by carrying through same 30 per cent. more water than it was designed and built to carry. If this gave out the amount available for the supply of the city would be decreased 60 per cent. and would endanger the supply through the 48-inch conduit laid alongside of the old conduit. The demand for a new conduit of a capacity equal to the old masonry conduit is imperative, so as to relieve the two present conduits of an excessive and dangerous strain.

The pumping facilities at Millburn Pumping Station are now overtaxed and do not pump the capacity of the new conduit from Millburn east, by an amount equal to 30,000,000 gallons per day, so that cost of operation and maintenance is largely increased by the forced use of excessive pressures on the conduits west of Millburn and by the loss of millions of gallons running to waste east of Millburn.

All of the pumping stations from wells require large additions of wells and improved machinery, coal-houses, etc., to be operated economically and to increase the amount obtained from same.

It is also necessary to purchase more land to increase the capacity of the well-pumping plants and to protect the present ponds, reservoirs and streams from pollution. The growing needs of the borough demand the laying of a large number of mains where houses are now built or building, and where buildings would be erected if the mains were laid, and of large mains to supplement the present small mains and increase the pressures as the demand increases.

The laying of mains is the best means of increasing the revenue.

The placing of meters to regulate use and stop the waste of water will be actively carried on under the laws which allow the Commissioner of Water Supply in his discretion to do same.

Thus by increasing the safety and amount of supply by distributing same where needed and by stopping the waste, the full supply can be kept up for a few years without any large expenditures for new watersheds, and equalize the receipts and expenditures so as to conform to the requirements of the Constitution and place the same on a business and paying basis.

I therefore present for immediate necessities an estimate of amounts required.

| | |
|---|---|
| For 66-inch steel conduit from Spring creek east to Millburn | $950,000 00 |
| For improvement and increase of Millburn Pumping Station and plant | 100,000 00 |
| For laying additional mains in city | 150,000 00 |
| For lands to increase well-pumping plants and to protect present source of supply from contamination | 150,000 00 |
| For additional machinery, wells, engine-houses, etc., at well-pumping plants | 150,000 00 |
| | $1,500,000 00 |

It will take two seasons, that is, two years, to prepare for and complete this work, and the bonds for same would only have to be issued as required.

The safety and necessary increase of supply demand the immediate commencement of this work and the growth and prosperity of the old City of Brooklyn will be greatly retarded if not carried out.

The year 1898 was an extraordinary year as to rainfall, being 10 inches above the average, with heavy rains in May, August and October, giving an equitable supply to the streams during the year, the storage capacity in the watersheds available being very small.

| | |
|---|---|
| Area of watersheds | 140 sq. miles. |
| Storage capacity | 1,300,000,000 gallons. |

And allowed this Department to carry on the work and give a full supply to the borough, at a decreased cost, especially in operating the numerous well plants.

During cycles of eleven years, two years of consecutive small rainfalls and heavy droughts are liable to occur, and to provide for the dry years immediate attention should be given to the necessities of this borough and the Borough of Queens, for an increased watershed to draw from, especially as the sinking of wells and obtaining water from same is very expensive and unsatisfactory means of obtaining water in large quantities.

## STATISTICS REGARDING PRIVATE WATER COMPANIES IN THE BOROUGH OF BROOKLYN.

### *The Flatbush Water Works Company.*

Pumping-engines—

3—2 Worthington duplex condensing engines; 1 Knowles duplex condensing engine. Capacities, 5,000,000, 3,000,000 and 3,000,000 gallons per 24 hours; all in good condition, only one working (the 5,000,000 Worthington). Water pressure at engine-house, 75 pounds.

Boilers—

3 horizontal tubular bricked in boilers (1 battery bricked in together), contain respectively, 99, 90 and 86 tubes; horse-power, 80; average steam pressure 85 pounds.

Stand-pipe—1 stand-pipe, 103 feet high; capacity, 239,700 gallons; diameter, 20 feet.

Pipe—

| Size. | Feet. |
|---|---|
| 4-inch | 68,258 |
| 6-inch (rendered by company) | 227,438 |
| 8-inch | 23,726 |
| 12-inch | 16,170 |
| 16-inch | 15,188 |
| 20-inch | 350 |
| Total | 351,130 |

66.5 miles.

Fire-hydrants—609 (December 19), Mathews type with one or two exceptions.

Gates—

| Size. | Feet. |
|---|---|
| 4-inch | 146 |
| 6-inch | 338 |
| 8-inch (approximate estimate of different sizes) | 24 |
| 12-inch | 12 |
| 16-inch | 15 |
| Total | 535 |

Wells—

12 open wells and 10 deep wells. Open wells, 8 feet diameter; 26 feet deep, with 4-inch tubes extending to depth of 18 feet. Deep wells, 4-inch suction, 40 feet deep.

### *The Blythebourne Water Company.*

Pumping-engines—

2 Worthington piston pumps situated near bottom of well; sizes, 7½ by 5 by 6, and 5¼ by 3½ by 5; capacities, 216,000 and 115,000 gallons per 24 hours.

2 Rider hot air engines employed in old pumping-station; capacities, 2,500 gallons per hour. (These engines are seldom in use). Water pressure at engine-houses, 30 pounds.

Boilers—2 upright tubular boilers. Larger contains 149 tubes, H. P., 50 ; 90 pounds steam pressure. Smaller contains 80 tubes ; horse-power, 30 ; 80 pounds steam pressure.

Pipe—

| Size. | Feet. |
|---|---|
| 8-inch | 850 |
| 6-inch (scaled from map, no record owned by company) | 12,015 |
| 4-inch | 26,400 |
| 3-inch | 1,450 |
| 2½-inch | 7,445 |
| 2-inch | 17,280 |
| Total | 65,440 |

12.4 miles.

Hydrants—14 various types.

Gates—

| Size. | Feet. |
|---|---|
| 8-inch | .... |
| 6-inch | 5 |
| 4-inch (taken from map) | 25 |
| 3-inch | 1 |
| 2½-inch | 8 |
| 2-inch | 8 |
| Total | 47 |

Tanks—

At main station, 2 tanks, 16 feet by 16 feet ; capacity, 25,000 gallons each.

At old station, 1 tank, 16 feet by 15 feet ; capacity 20,000 gallons each.

Wells—

Main station, one 5-foot open circular brick well, 90 feet deep.

Old station, one 7-inch driven well, 52 feet deep.

Old station, one 8-inch driven well, 52 feet deep.

## *The West Brooklyn Water Company.*

Pumping Engines—

1 7½ by 5 by 6 Worthington piston pump ; capacity 216,000 gallons per 24 hours (main station).

1 8-inch Rider hot air engine ; capacity 2,000 gallons per hour (old station).

Water pressure at main engine-house, 27 pounds.

Boiler—

1 upright tubular boiler, 73 tubes ; horse-power, 15 ; allowed steam pressure, 80 pounds.

Pipe—

| Size. | Feet. |
|---|---|
| 8-inch | 1,920 |
| 6-inch (scaled from map, no record kept by Company) | 19,140 |
| 4-inch | 50,405 |
| 2½-inch | 11,395 |
| Total | 82,860 |

15.7 miles.

Hydrants—35.

Tanks—

At main station 1 tank, 15½ feet high, 15 feet diameter ; capacity 20,000 gallons.

At old station, 2 tanks, 15 feet high, 15½ feet diameter ; capacity 22,000 gallons.

Gates—

| Size. | Feet. |
|---|---|
| 8-inch | 3 |
| 6-inch (taken from map) | 24 |
| 4-inch | 19 |
| 2½-inch | 1 |
| Total | 47 |

Wells—

1 6-foot open circular brick well, 68 feet deep at main station.

1 6-inch driven well, 60 feet deep at old station.

### *Hans. C. Pfalgg Raf's Private Water Plant.*

Pumping Engines—

1 4½ by 2¾ by 4 Worthington piston pump, capacity 60,000 gallons per 24 hours. Engine situated near bottom of well.

A windmill with capacity of about 1,800 gallons per hour.

The pump operates only when the windmill is incapacitated.

Boiler—

1 upright tubular boiler, 29 tubes ; horse-power, 6, and 80 pounds allowed steam pressure.

Pipe—

| Size. | Feet. |
|---|---|
| 4-inch (scaled from map) | 950 |
| 2-inch | 6,725 |
| 1¼-inch | 475 |
| Total | 8,150 |

1.5 miles.

Hydrants—1.

Gates—

| Size. | Feet. |
|---|---|
| 4-inch | 3 |
| 2-inch | 14 |
| Total | 17 |

Well—1 open circular brick well, 2 feet 8 inches in diameter and 45 feet deep.

Tank—1 tank, 12 feet by 12 feet in height; capacity 10,000 gallons.

### *Water Supply of Germania Real Estate Company.*

Water is supplied by the Flatbush Water Works Company, to whom all water bills are paid.

Pipe—About 43,000 feet of 6-inch and 12,000 feet of 4-inch. Total, 65,000 feet—12.3 miles.

(Scaled from map; no record of pipe in possession of company.)

Hydrants—49, mostly of Mathews' single-nozzle type.

Gates—3 4-inch gates and 15 6-inch gates. Total, 18.

### *Water Supply of the W. P. Rea Real Estate Company.*

Water is supplied to this system by the Flatbush Water Works Company.

Pipes—7,614 feet of 4-inch and 1,000 feet of 2-inch. Total, 8,614 feet—1.6 miles. (Length of different size pipe rendered by Company.)

Hydrants—3.

Gates—8 4-inch gates.

### *Water Supply of the Ardmore Real Estate Company.*

Water is supplied to this system by the Flatbush Water Works Company.

Pipe—About 7,500 feet of 2-inch pipe.

Hydrants—3.

Gates—No record can be found showing the gates.

### *Long Island Water Supply Company's Pumping Plant and Pipe System, Located in the Twenty-sixth Ward, Borough of Brooklyn, N. Y.*

Engines—The pumping machinery of the above plant consists of two Davidson compound condensing engines, one Davidson compound duplex condensing engine, four Davidson air pumps, one boiler feed pump, one Korting's injector.

The two Davidson compound condensing engines were installed in the year 1881, and appear from a superficial examination to be in good condition. One of these engines is held in reserve. Their displacement is forty gallons per stroke each, with a capacity of twenty-five strokes per minute, equivalent to a theoretical pumpage of 1,440,000 gallons in twenty-four hours, or 2,880,000 gallons with both engines running. The working pressures, etc., of the above engines are fifty pounds steam and eighty pounds water pressure; the number of strokes per minute is twenty and 75 horse-power is developed. The diameters of the steam cylinders are 18 inches by 32 inches, and of water cylinders, 24 inches. Two Davidson air pumps are connected with these engines.

The Davidson compound duplex condensing engine has a displacement of eighty gallons per stroke, and a capacity of thirty-two strokes per minute, equivalent to a theoretical pumpage of 3,680,000 gallons in twenty-four hours. The working pressures, etc., are seventy pounds steam and eighty pounds water pressure; number of strokes per minute is twenty-nine; 150 horse-power is developed. Diameters of steam cylinders is 16 inches by 30 inches, and of water cylinders, 24 inches. One air pump is connected with this pump. These pumps were installed in the year 1897, and appear from a superficial examination to be in very good condition.

There is also one air-pump connected with the air chamber on the suction main, and one independent boiler feed-pump, held in reserve.

At the present rate of pumping the consumption per 24 hours approximates 4,500,000 gallons.

The injector is of the pattern known as Korting's Universal No. 10, and develops 350 H, P.

Boilers—There are four boilers, of which two Davidson boilers have 50 4-inch tubes, an allowed pressure of 105 pounds, and a working pressure of 70 pounds; each boiler develops 75 H. P. A 4-inch steam-pipe leads from these boilers to the old Davidson pumps. The above two boilers were installed in the year 1881, and exhibit vertical cracks in their iron front. They are 16 feet long and 5 feet in diameter.

One Bigelow boiler has 100 3-inch tubes, allowed pressure of 105, and a working pressure of 70 pounds, 100 H. P. being developed; this boiler is 16 feet long and 5.5 feet in diameter.

One Hampson boiler has 84 3-inch tubes, an allowed pressure of 105, and a working pressure of 70 pounds; 75 H. P. being developed. This boiler is 15 feet long and 5 feet in diameter.

The Bigelow boiler was installed in the year 1894, and the Hampson boiler in 1897; they appear, from a superficial examination, to be in good condition.

Reservoir—The pumps discharge into a single 16-inch force-main, 10,460 feet long, which leads to a "reservoir which is located north of Highland Boulevard, between Van Siclen and Schenck avenues. The high-water line is about 150 feet above mean tide. The reservoir plot comprises about 6.8 acres. The capacity of the reservoir is 5,000,000 gallons." This reservoir receives only the surplus water pumped, as all distribution mains branch from the above 16-inch force-main.

Pipe—The distribution-pipe system comprises about 47 miles of 6-inch, 8-inch and 12-inch mains, as follows; 37.4 miles of 6-inch pipe; 8.6 miles of 8-inch pipe; 1.2 miles of 12-inch pipe. There are, also, 2 miles of 16-inch force-main pipe not included in the above estimate.

Hydrants—There are 673 hydrants actually in use, of which 14 are double-nozzle. For the use of these hydrants the city pays to the above company the sum of $31,145 annual rental for 647 hydrants; 22 hydrants being furnished free of charge in place of 25 drinking hydrants, stipulated to be furnished in the original contract, free of charge ; two hydrants are on private property, and two hydrants have not been charged to the city, in order to prevent any possible overcharge by the company.

Gates—The gates on the distribution system are in number and size as follows : 257 6-inch gates, 49 8-inch and 6 12-inch ; there are 7 16-inch gates on the force main leading to the reservoir.

Wells—The entire water supply is derived from a system of driven wells, consisting of 22 2-inch suction wells, 14 6-inch suction wells and 5 6-inch flowing wells.

The 22 2-inch wells are driven to depths of from 35 to 45 feet, and are connected up by a 6-inch pipe from which a 10-inch pipe increased to a 12-inch leads to a 20-inch main suction pipe ; there is also 1 6-inch well connected with the above 12-inch pipe, and 2 6-inch wells with the 20-inch main suction. Eleven of the 6-inch wells are connected up by a 10-inch pipe, from which a 16-inch main leads to the pumping engines.

All of the above 6-inch wells are driven to depths of from 78 to 85 feet.

The 5 6-inch flowing wells (one of which is disabled) are driven to a depth of 45 feet below the bottom of a large open well ; this open well is 25 feet deep and 24 feet in diameter, and has a cement bottom, bricked sides and covered top. A 12-inch suction pipe leads from the bottom of this well to the 20-inch main suction pipe.

There are no test wells by which fluctuations in elevation of ground water can be ascertained.

## *Description of the Water-Works of the German-American Improvement Company, Twenty-sixth Ward, Borough of Brooklyn.*

Engines—The pumping machinery of the above plant consists of one Worthington compound duplex engine, with 8-inch high and 12-inch low-pressure steam cylinder, 7-inch water cylinders and a 10-inch stroke. This pump is operated for about five hours daily, pumping about 70,000 gallons. It was installed in August, 1892, and appears from a superficial examination to be in good condition.

The boilers are fed by a small Worthington duplex pump ; size of steam cylinders are 3 inches by 2 inches, and it has a 3-inch stroke.

A "Universal No. 2" injector is held in reserve.

Boilers—Power is obtained from an upright Erie boiler containing 114 2-inch tubes. Allowed pressure is 70 pounds ; average working pressure is 65 pounds and develops 30 H. P.

A horizontal Logan boiler, built in November, 1897, is held in reserve ; it is 11 feet long and 4.8 feet in diameter, has 60 3-inch tubes, an allowed pressure of 80 pounds and develops 50 H. P. The Erie boiler was installed in August, 1892, and is in fair condition. The Logan boiler has had very little usage.

Standpipe—A standpipe adjoins the building in which the pumping plant is located, and is built of riveted steel plates. It is fifteen feet in diameter inside, and 128.5 feet high, with a capacity of 169,850 gallons.

Pipe—The above company owns two tracts of land, known as Nos. 1 and 2. The pipe system of Tract No. 1 comprises 5.4 miles of 6-inch cast iron pipe ; that of tract No. 2 comprises 3 miles of 6-inch iron pipe, the water supply of which is furnished by the Long Island Water Supply Company at a fixed rate ; this supply averages 90,000 gallons daily.

Hydrants—There are 39 hydrants in place, of the "McLean No. 3" single-nozzle pattern, all located on Tract No. 1. On Tract No. 2 there are 22 single-nozzle hydrants of the above pattern, and connections are laid for 25 more.

Gates—There are 32 6-inch gates in place on Tract No. 1, and 37 6-inch gates on Tract No. 2.

Wells—The water supply for Tract No. 1 is obtained from 3 6-inch driven wells, at a depth of 65 feet, and are connected by a 6-inch main.

## Borough of Queens.

The six pumping stations have been kept in order during the quarter and the hydrants and mains in repair. Having abondoned the building and yards at the City Hall, Long Island City, the material, horses and wagons have had to be removed to other places. It is absolutely necessary that proper yards for storage of materials be established in each of the first and third wards as soon as possible.

The water at station No. 2 is still brackish although the worst wells have been shut off and the station only run for sixteen hours per day. A supply is still furnished by the Citizens' Water Company, which enables the Department to keep up with the increased demand and improve the quality of the water. The necessity for the laying of a large humber of mains to supply the new buildings erected and to be erected and to connect the several pumping stations and increase supply is very apparent; more or less of these have been approved by the Board of Public Improvements and are now before the Municipal Assembly for their action. The sinking of new wells and improvement in the several pumping stations will be also brought to the attention of the Board of Public Improvements as soon as the necessary test wells are sunk as provided for in the ordinances now before the Municipal Assembly.

### WORK DONE DURING THE QUARTER.

57 taps put in.
14 leaks in pipes repaired.
21 stop-cocks repaired.
91 hydrants repaired.
9 new stop-cocks set.
7 new hydrants placed.

### WORK DONE DURING THE YEAR 1898.

214 taps put in.
57 leaks in pipes repaired.
49 stop-cocks repaired.
187 hydrants repaired.
21 new stop-cocks set.
7 new hydrants set.
17 new boxes set.
5 drinking hydrants repaired.

### AVERAGE DAILY AMOUNT OF WATER PUMPED DURING THE QUARTER.

| | Gallons. |
|---|---|
| First Ward, city stations | 1,886,633 |
| First Ward, by Citizens' Water Company | 1,479,087 |
| Third Ward, city stations | 1,460,309 |
| Total average daily uses, gallons | 4,826,029 |

Contracts for coal and for improvements to the College Point pumping station have been entered into.

### EXPENDITURES FOR THE QUARTER ENDING DECEMBER 31, 1898.

| | |
|---|---|
| Maintenance and repairs of water-pipes | $4,493 61 |
| Pumping stations, fuel and supplies | 2,408 24 |
| Salaries, office of Deputy Commissioner | 3,616 62 |
| Salaries, pumping stations | 5,328 58 |
| Supplying water to Long Island City | 11,252 50 |
| Standpipe College Point | 132 13 |
| Standpipe, Flushing | 3,105 12 |
| College Point Water Works (fund for steam-pump) | 16 30 |
| | $30,353 10 |

### SUMMARY OF EXPENDITURES FOR THE YEAR 1898.

| | |
|---|---|
| Maintenance and repairs of water pipes | $15,819 77 |
| Pumping stations, fuel and supplies | 16,030 07 |
| Salaries, office of Deputy Commissioner | 12,715 64 |
| Salaries, pumping stations | 21,098 63 |
| Supplying water to Long Island City | 15,569 23 |
| Standpipe, College Point | 3,917 13 |
| Standpipe, Flushing | 3,105 12 |
| College Point Water Works (fund for steam-pipe) | 2,770 96 |
| Telephone service | 582 75 |
| | $91,609 30 |

## RECORD OF COAL USED AND WATER PUMPED.

| | Pounds of Coal (Average per Day). | Gallons Pumped (Average per Day). |
|---|---|---|
| First Ward, Station 1 | 4,900 | 609,443 |
| First Ward, Station 2 | 6,000 | 520,000 |
| First Ward, Station 3 | 3,500 | 757,190 |
| | | 1,886,633 |
| Third Ward, Flushing Station | 3,147 | 751,392 |
| Third Ward, College Point Station | 1,989 | 567,561 |
| Third Ward, Whitestone Station | 1,436 | 141,355 |
| | | 1,460,308 |
| Flushing avenue meter | .... | 1,010,432 |
| Citizens' Water Supply Company, Laurel Hill meter | ...... | 468,655 |
| | | 1,479,087 |
| Total | ...... | 4,826,028 |

To provide for a large future supply to the Borough of Queens brings to the front the fact that for any large increase of water supply to the Borough of Brooklyn the conduits for same would have to pass through the Borough of Queens, and, being both in the city, the increased supply can be used in both boroughs, and all conduits and appurtenances built to provide for both boroughs.

## LONG ISLAND CITY, FLUSHING, WHITESTONE AND COLLEGE POINT.

| | Miles of Water-mains. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2-inch. | 4-inch. | 6-inch. | 8-inch. | 10 inch. | 12-inch. | 14-inch. | 16-inch. | Total. |
| Long Island City | .... | 0.12 | 9.55 | 8.48 | 3.98 | 0.33 | 0.73 | .... | 23.19 |
| Flushing | .... | 1.09 | 4.67 | 4.47 | 2.49 | 2.32 | .... | .... | 15.04 |
| Whitestone | 0.60 | 3.51 | 3.69 | 2.14 | 0.71 | 0.31 | .... | .... | 10.42 |
| College Point | .... | .... | 8.47 | 0.71 | 1.07 | 4.61 | .... | 0.56 | 15.42 |
| | 0.60 | 4.72 | 26.38 | 16.07 | 8.25 | 7.57 | 0.73 | 0.56 | 64.07 |

| | Stop-cocks. | | | | | | | | | Hydrants. |
|---|---|---|---|---|---|---|---|---|---|---|
| | 4-inch. | 6-inch. | 8-inch. | 10-inch. | 12-inch. | 14-inch. | 16-inch. | 20-inch. | Total. | Number. |
| Long Island City | .... | 63 | 14 | 12 | 2 | ..... | ..... | ..... | 91 | 67 |
| Flushing | 27 | 142 | 59 | 3 | 9 | 7 | 1 | 1 | 248 | 185 |
| Whitestone | 20 | 12 | 9 | 5 | .... | ..... | ..... | ..... | 46 | 91 |
| College Point | .... | 82 | 3 | 3 | 4 | ..... | 2 | ..... | 94 | 94 |
| | 47 | 299 | 85 | 23 | 15 | 7 | 3 | 1 | 479 | 437 |

| Name of Company. | Pumping Engines. | | |
|---|---|---|---|
| | Capacity of Engines. | Water Pressure at Station. | Present Condition. |
| Citizens' Water Supply Company................ | Station 1—2,000,000 gallons.<br>1,000,000 "<br>750,000 " | 75 pounds. | Excellent.... |
| | Station 2—2,000,000 gallons.<br>2,000,000 " | 78 pounds. | Excellent.... |
| | Station 3—4,000,000 gallons. | ........ | Excellent.... |
| Queens County Water Company................. | 2,000,000 gallons.<br>2,000,000 "<br>4,000,000 " | 55–76 pounds. | Excellent.. |
| Jamaica Water Supply Company................ | 6,000,000 gallons, total of engines.................. | 67 pounds. | Good...... |
| Woodhaven Water Supply Company............. | 3,000,000 gallons, total of engines................. | 45 pounds. | Good...... |
| Wyckoff Heights Water Company. ............. | 3,000,000 gallons, total of engines.................. | 45 pounds. | Good........ |

| Name of Company. | Miles of Mains. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 16-inch. | 14-inch. | 12-inch. | 10-inch. | 8-inch. | 6-inch. | 4-inch. | 3-inch. | 2-inch. | Total. |
| Citizens' Water Supply Company.................... | 1 | 1 | 2 | 6 | 10 | 19 | 5 | 0.10 | 0.2 | 44.3 |
| Queens County Water Company...................... | 1 | .3 | 4 | .10 | 6 | 16 | 7 | 1 | 2 | 37.43 |
| Jamaica Water Supply Company..................... | .. | ... | .. | .... | 60 | .. | .... | .... | ... | 60 |
| Woodhaven Water Supply Company................. | .. | ... | .. | .... | 32 | .. | .... | .... | ... | 32 |
| Wyckoff Heights Water Company...................... | .. | ... | .. | .... | .. | 1 | 0.75 | .... | ... | 1.75 |

COMPANIES.

| BOILERS. | | STANDPIPES. | | RESERVOIRS. | | WELLS. | | |
|---|---|---|---|---|---|---|---|---|
| Capacity of Boilers. | Pressure. | Diameter. | Height. | Capacity, Gallons. | Number of Reservoirs. | Capacity, Gallons. | Number of Wells. | Depth. |
| 80 horse-power. | 100 pounds. | 25 feet. | 50 feet. | 183,580 | 1 | 3,500,000 | 28 | 65 feet. |
| 50 " | 80 pounds. | | | | | | 78 | 70 feet. |
| 50 " | 80 pounds. | | | | | | 20 | 45 feet. |
| 100 "<br>100 "<br>125 " | 85 pounds.<br>85 pounds.<br>85 pounds. | 20 feet.<br>16 feet. | 100 feet.<br>125 feet. | ........ | None. | ........ | 45 | 32 feet.<br>50 feet. |
| 100 "<br>100 " | 90 pounds.<br>90 pounds. | 50 feet. | 40 feet. | ........ | None. | ........ | 1<br>25 | 47 feet. |
| Supplied with steam by Lalance & Grosjean | ........ | None. | ........ | ........ | 2 | 4,000,000 | 16 | 98 feet to 143 feet. |
| None. | ........ | None. | ........ | ........ | None. | ........ | .. | ...... |

| STOP-COCKS. | | | | | | | | | | | HYDRANTS. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16-inch. | 14-inch. | 12-inch. | 10-inch. | 8-inch. | 6-inch. | 4-inch. | 3-inch. | 2-inch. | 1½-inch. | Total. | Single. | Double. | Triple. |
| 2 | 3 | 4 | 18 | 45 | 97 | 26 | 3 | 2 | .. | 200 | 20 | ... | 339 |
| 3 | 3 | 19 | 3 | 34 | 152 | 124 | 17 | .. | 2 | 357 | ... | 260 | 18 |
| .. | .. | .. | .. | .. | ... | ... | .. | .. | .. | 300 | 359 | 272 | ... |
| .. | .. | .. | .. | .. | ... | ... | .. | .. | .. | ... | ... | 480 | ... |
| .. | .. | .. | .. | .. | ... | ... | .. | .. | .. | 42 | ... | 8 | ... |

## BOROUGH OF RICHMOND.

### EXPENDITURES FOR THE QUARTER ENDING DECEMBER 31, 1898.

| | |
|---|---|
| Contingencies | $9 85 |
| Pumping stations—Salaries and supplies | 1,939 80 |
| Salaries—Office of Deputy Commissioner | 1,266 64 |
| Total | $3,216 29 |

### EXPENDITURES FOR THE YEAR 1898.

| | |
|---|---|
| Contingencies | $40 76 |
| Pumping stations—Salaries and supplies | 3,023 44 |
| Salaries—Office of Deputy Commissioner | 4,283 58 |
| Total | $7,347 78 |

Having no moneys available for laying mains, only 700 feet have been laid during the year. The pumping plant has been kept in good order and the wells have so far furnished a full supply. An ordinance is now before the Municipal Assembly for sinking three new wells which will fully develop the property now owned by the city.

Average daily use of water, 50,000 gallons.

15 taps placed during quarter ending December 31, 1898.

63 taps placed during the year 1898.

The supply of water for this borough is principally by private water companies. The available supply in Richmond County it being surrounded by salt water and with very limited drainage areas where surface water could be obtained from streams and stored during wet weather and being all within the limits of the city, some other means will have to be adopted to increase the supply. All of the water supplied by the private water companies is supplied from wells; the water is good, but very hard and has over 20 parts per 100,000 of solids by evaporation, New York and Brooklyn 8 only; this again limits the capabilities of a further supply from wells, of a quality which can be used in boilers and for manufacturing purposes to the best advantage.

The contracts with the private water companies end in 1902, so that it becomes necessary during the next year to decide what shall be done as to a further supply.

This new supply should be of a soft, wholesome water, suitable for all purposes.

Owing to the want of funds no new work has been commenced during the year and on account of the holding of many ordinances for laying mains, etc., in the Municipal Assembly, but little has been done. Are now preparing contracts, etc., for the work authorized in November and December.

### TOTAL AVERAGE DAILY USE OF WATER.

| | Gallons. |
|---|---|
| Boroughs of Manhattan and The Bronx, city | 243,000,000 |
| Boroughs of Manhattan and The Bronx, private companies | 1,900,000 |

| | Gallons. |
|---|---|
| Borough of Brooklyn, city | 93,500,000 |
| Borough of Brooklyn, private companies | 9,000,000 |
| Borough of Queens, city | 4,800,000 |
| Borough of Queens, private companies | 9,000,000 |
| Borough of Richmond, city | 50,000 |
| Borough of Richmond, private companies | 6,500,000 |
| Total gallons | 367,750,000 |

Respectfully yours,

GEO. W. BIRDSALL, Chief Engineer.

JANUARY 27, 1899.

STATEMENT OF CAPACITY AND CONDITION OF PRIVATE WATER COMPANIES.

*Crystal Water Company.*

| | | |
|---|---|---|
| Clove Pumping Station— | | |
| Number of pumping-engines | | 2 |
| Daily capacity in gallons | | 3,500,000 |
| Water pressure at station | pounds, | 55 |
| High Service Pump— | | |
| Daily capacity in gallons | | 1,000,000 |
| Number of pumping-engines | | 1 |
| Water pressure at station | pounds, | 155 |
| Boilers— | | |
| Number of boilers in service | | 3 |
| Capacity, horse-power | | 200 |
| Cold water pressure, test | pounds, | 120 |
| Steam carried | pounds, | 80 |
| Reservoirs— | | |
| Low service reservoir, circular; size, 250 by 18 feet deep, capacity | gallons, | 4,000,000 |
| Elevation of reservoir above sea level | feet | 251 |
| Standpipes | | 1 |
| Height above sea level | feet, | 418 |
| Size 20 by 30 on 60-foot trestle | | ...... |
| Water lands at elevation 130 | acres, | 40 |
| Suction main, 20-18-14-12 | feet, | 3,000 |
| Number of wells | | 52 |
| Size of wells | inches, | 6 |
| Depth of wells | feet, | 60 to 120 |

Bulls Head Pumping Station—

| | | |
|---|---|---|
| Number of pumping-engines | | 1 |
| Daily capacity in gallons | | 1,500,000 |
| Water pressure at station | pounds, | 120 |

Boilers—

| | | |
|---|---|---|
| Number of boilers in service | | 2 |
| Capacity, horse-power | | 120 |
| Cold water pressure, tested | | 120 |
| Steam carried | pounds, | 80 |
| Water is pumped to same reservoir as Clove Station at elevation | | 251 |
| Water lands at elevation 10 | acres, | 115 |
| Suction main 14–12–8–6 | feet, | 4,000 |
| Number of wells | | 46 |
| Size of wells | inches, | 6 |
| Depth of wells | feet, | 50 to 75 |

Mains—

| | | |
|---|---|---|
| Total mileage, 4 inches to 16 inches | miles, | 48 |
| Number of fire-hydrants | | 340 |
| Number of draw-hydrants | | 65 |
| Number of water-gates, 4 inches to 16 inches | | 82 |
| Number of taps, ½-inch to ¾-inch | | 2,556 |

The pumping stations, machinery, boilers and general physical condition of the system are good.

*Staten Island Water Supply Company.*

Pumping-engines—

| | | |
|---|---|---|
| Number of pumping-engines | | 3 |
| Daily capacity in gallons | | 8,000,000 |
| Water pressure at engine-house | pounds, | 150 |
| Present condition | | Good. |

Boilers—

| | | |
|---|---|---|
| Number of boilers | | 3 |
| Total horse-power | | 340 |
| Cold-water pressure | pounds, | 120 |
| Steam pressure (carried) | pounds, | 80 |

Reservoirs—

| | | |
|---|---|---|
| Number of reservoirs | | 1 |

Size: diameter, 80 feet; height, 22 feet.

Mains—

Total mileage.................................................. ... .... 70

Sizes : 4 inches to 16 inches.

Hydrants—

Number of hydrants................................... ............... 590

Gate-valves—

No record.

Wells—

Number of wells... ....................... .......................... 194

Size : 6 inches.

Depth : from 40 feet to 128 feet.

## THE STATEN ISLAND WATER SUPPLY COMPANY.

### ANALYSIS OF THE WATER, ALSO RULES AND REGULATIONS AND CONDITIONS GOVERNING ITS INTRODUCTION AND SUPPLY, WITH ANNUAL WATER RATES AND RULES FOR PLUMBERS.

(Office, West New Brighton, 1898).

### ANALYSIS.

PRINCETON, N. J., November 9, 1880.

Mr. J. R. CROES :

DEAR SIR—The two samples of water left with me on Saturday last yielded the following results :

*Sample Parts—Per* 1,000 *Gallons.*

| | FREE AMMONIA. | ALBUMOIDAL CHLORINE AMMONIA. | GRAINS, PER U. S. GALS. | TOTAL SOLID. | HARDNESS, DEG. PER U. S. GALS. |
|---|---|---|---|---|---|
| 1—E. Flowing well.............................. | 0.002 | 0.010 | 0.33 | 5.2 | 2.7 |
| 2—W. Flowing well.............................. | 0.004 | 0.007 | 0.49 | 6.7 | 2.00 |

Remarks.—Both samples clear and odorless, even when kept for some time.

The free and albumoidal ammonia is exceedingly small as regards organic impurity ; there is practically no choice between them, and they are the best samples of water I have ever seen in that respect.

(Signed) H. B. CORNWALL.

It will be observed by the analysis that the hardness of the water is only 2 7-10, while 6 per cent. is considered soft water.

### CERTIFICATE OF ANALYSIS.

No. 1982. NEW YORK, July 10, 1883.

SIR—The sample of water submitted to me for examination contains in one U. S. gallon of 231 cubic inches :

Municipal Reference Library
BRANCH OF
NEW YORK PUBLIC LIBRARY
MUNICIPAL BUILDING

| | |
|---|---|
| Chlorine in chlorides | 0.5124 grains. |
| (Equal to sodium chloride 0.8440 grains). | |
| Nitrogen in nitrele | 0.0479 grains. |
| Albuminoid ammonia | 0.00082 grains. |
| Free ammonia | Faint trace. |
| Mineral matter | 7.5810 trace. |
| Organic and volatile matter | Trace. |
| Phosphalis | Faint trace. |
| Hardness, equivalent to carbonate of lime, before boiling | 2.923 grains. |
| Hardness, equivalent to carbonate of lime, after using | 3.313 grains. |

Respectfully,

C. F. CHANDLER, Ph. D.

NEW YORK, July 10, 1883.

MY DEAR SIR—I inclose herewith a report of the analysis of the sample of water submitted by you, and would say that it exhibits no indications whatever of contamination either by refuse of any kind or by sea water—on the contrary, it is a remarkably pure specimen of sweet water.

Very truly yours,

C. F. CHANDLER.

To Mr. H. BRIGHTMAN, President, Staten Island Water Supply Company.

---

CHAS. M. STILLWELL, A. M. THOMAS S. GLADDING, A. M.

OFFICE AND LABORATORY OF STILLWELL & GLADDING,
ANALYTICAL AND CONSULTING CHEMISTS,
NO. 55 FULTON STREET, CORNER CLIFF STREET, P. O. BOX 1261,
NEW YORK, July 17, 1897.

Analysis No. 74939.

CERTIFICATE OF ANALYSIS

*Of a Sample of Water Marked Pump No.* 2, *Received from the Staten Island Water Supply Company, July* 15, 1897 :

| | PARTS PER 100,000. | GRAINS PER U. S. GALLON OF 231 CUBIC INCHES. |
|---|---|---|
| Chlorine | 2.93 | 1.70 |
| Free Ammonia | 0.003 | 0.00175 |
| Albuminoid Ammonia | 0.008 | 0.00465 |
| Organic and Volatile (loss on ignition) | 3.40 | 1.97 |
| Mineral matter (non-volatile) | 15.80 | 9.16 |
| Total solids (by evaporation) | 19.20 | 11.13 |
| Oxide of Iron | 0.043 | 0 026 |

An excellent water.

Very respectfully,

STILLWELL & GLADDING, Chemists to the New York Produce Exchange.

### ANNUAL RATES.

Until further notice the following rates will be charged annually for water:

#### *Dwelling-houses.*

| | |
|---|---|
| Occupied by one family, for the first faucet | $8 00 |
| For each additional faucet, to be used by the same family | 1 00 |
| Where a house is occupied by more than one family, and less than four, one faucet only being used by all, for each family | 6 00 |
| Where a house is occupied by four or more families, and but one faucet is used by all, for each family | 5 00 |
| Where a house is occupied by more than one family, the highest rates will be charged for each family having the water carried into their part of the house | 8 00 |
| For the first bath-tub | 5 00 |
| When used by more than one family, for each family | 4 00 |
| For each additional bath-tub | 2 50 |
| The first pan or hopper water-closet, with self-regulating faucet | 5 00 |
| When used by more than one family, for each family | 4 00 |
| Each additional pan or hopper water-closet, with self-regulating faucet | 2 50 |
| For hopper water-closets, special rates will be made. | |
| Urinal | 2 50 |
| One set wash-tubs, not exceeding three tubs | 3 00 |
| Each additional set wash-tub | 1 00 |

Where two faucets are used, one for hot and one for cold water, both emptying into one vessel, but one charge will be made for both.

#### *Boarding Houses.*

| | |
|---|---|
| For the first faucet | $10 00 |
| Each additional faucet | 1 00 |
| For pan or hopper water-closet, with self regulating faucet | 8 00 |
| Each additional pan or hopper water-closet, with self-regulating faucet | 2 50 |
| Hopper water-closets, without self-regulating faucet, each | 20 00 |
| Urinal | 4 00 |
| Bath-tub, when used by boarders | 10 00 |
| For each tub in a public bath-house or hotel | 12 00 |
| For each water-closet in a public bath-house | 8 00 |

#### *Stores, Offices, Etc.*

| | |
|---|---|
| For each tenement occupied as a store, warehouse or office | $6 00 |
| Where two or more such tenements are supplied from the same faucet, each | 5 00 |
| For markets, saloons, workshops, or for purposes not included in any other classification, and not requiring more than an ordinary supply of water, taken from one faucet, from | 6 00 to 25 00 |

| | |
|---|---|
| For pan or hopper water-closet, with self-regulating faucet, used by the occupants of one tenement only | $5 00 |
| When used by occupants of more than one tenement, for each | 4 00 |

### *Private Stables.*

| | |
|---|---|
| For first horse | $5 00 |
| Each additional horse | 3 00 |
| Each cow | 2 00 |

### *Livery, Club and Boarding Stables.*

| | |
|---|---|
| For not exceeding three horses, the same as private stables | ........ |
| For each additional horse | 2 00 |

### *Truck and Cart Stables.*

| | |
|---|---|
| For not exceeding three horses, the same as private stables | ........ |
| For each horse, if more than three | 2 00 |
| Rates for stables include water for washing carriages, omnibuses and cars, without hose | ........ |
| No stable less than | 8 00 |

Where hose is used in any stable, an addition to the above charges will be made of six dollars for the first horse and two dollars for each additional horse.

### *Hose.*

| | |
|---|---|
| For the right to attach hose of not more than three-eighths inch orifice for washing windows or watering gardens | $10 00 |

All persons using hose must do so before 8 A. M. and after 4 P. M. Hose must not be used to wash the filth of gutters down upon neighbors, nor must it be converted into jets, or the water suffered to run to waste or leak. A permit to use hose gives authority to wash the sidewalks or water the gardens of the owner paying for the same, and if used upon another person's property an extra rate of $10 for each and every adjoining lot upon which the hose is used, will be charged against the property having the right to use hose.

Fixed jets and revolving lawn sprinklers (so called) will be rated as fountains and charged accordingly.

### *Steam-engines.*

| | |
|---|---|
| Stationary steam-engines, working not not over ten hours per day, will be charged by the horse-power, as follows: For each horse-power up to and not exceeding ten | $7 00 |
| For each horse power exceeding ten, and not over fifteen | 6 00 |
| For each horse power over fifteen | 5 00 |

### *Eating Houses.*

| | |
|---|---|
| Refectories, confectioneries, eating houses, market and fish stalls, provision shops, refreshment and oyster saloons, according to the quantity of water used, will be charged from | $10 to 50.00 |

### *Building Purposes.*

| | |
|---|---|
| For each cask of lime or cement used | $0 06 |

### *Bakeries.*

| | |
|---|---|
| Bakeries will be charged according to the average daily use of flour, namely, for each barrel per day, per annum | $5 00 |
| Provided, that in no case shall any bakery be charged less than | 10 00 |

### *Hotel and Bar Rooms.*

| | |
|---|---|
| For one faucet behind the bar, per annum | $10 00 |
| For one faucet in bar room, per annum | 8 00 |
| Additional faucets per annum | 4 00 |
| Water-closet, self-acting | 5 to 12 00 |
| Water-closet, hopper | 12 to 20 00 |
| Urinal, self-acting | 4 00 |
| Urinal, flowing | 5 to 8 00 |
| Bath | 5 to 12 00 |

### *Fountains.*

| | |
|---|---|
| Fountains supplied with water will be charged upon the estimated quantity used, namely, for each one hundred gallons, used daily, per annum | $10 00 |
| Counter or conservatory, one-sixteenth of inch jet, six hours per day | 8 00 |
| One-eighth inch jet, six hours per day | 10 00 |
| Three-sixteenths inch jet, six hours per day. | 20 00 |
| One-quarter inch jet, six hours per day | 35 00 |
| Five-sixteenths inch jet, six hours per day | 60 00 |

Special rates for an excess over above time and size.

### *Horse Troughs.*

| | |
|---|---|
| Each trough, per annum | $10 00 |

Each trough is to be fitted with a proper ball-cock to prevent waste, and this must be kept in order.

### *Boarding Schools.*

| | |
|---|---|
| From | $25 to 150 00 |

### *Markct Stalls and Stands.*

| | |
|---|---|
| From | $8 to 30 00 |

### *Barber Shops.*

| | |
|---|---|
| 1 faucet or basin | $8 00 |
| Each additional | 3 00 |
| Bath | 6 00 |
| Each additional | 4 00 |
| Water-closet | 6 00 |
| Each additional | 4 00 |

### *Confectioneries.*

| | |
|---|---|
| 1 faucet or basin | $8 00 |
| 1 faucet for soda water fountain | 10 00 |

### *Drug Stores.*

| | |
|---|---|
| 1 faucet or basin | $8 00 |
| 1 faucet for soda water fountain | 10 00 |

### *Slaughter-houses.*

| | |
|---|---|
| From | $50 to 400 00 |

### *Street Sprinkling.*

Scarcity of water at times may reduce the street sprinkling service ; hence water will be furnished by special contract only.

### *Manufacturing and Other Purposes.*

In all cases where large quantities of water are required, the charge for the same shall be as follows, the quantity to be ascertained by meters:

For 2,000 gallons used daily, at the rate of 5 cents per 100 gallons.

Where the average daily use is less than 5,000 gallons and more than 2,000 gallons, at the rate of 3 cents per 100 gallons.

For the quantity in excess of 5,000 gallons up to 10,000, at the rate of 2 cents per 100 gallons.

For other cases, special rates will be made.

It being frequently necessary to shut off the water from the street mains to make extensions and repairs, without giving notice, all persons having boilers within their premises, not supplied by tanks, but depending upon the pressure from the street mains to keep them supplied, are cautioned against danger of collapse.

All matters not hereinbefore mentioned are reserved for special contract by and with the Company.

## RULES AND REGULATIONS.

(Subject to Additions and Amendments.)

1. All applications for the use of water must be made at the office of the company, in the form prescribed, stating fully and truly the various uses to which the water is to be applied.

2. All plumbing in houses must be completed and service run from the house to the stop box at the curb, before applying for a permit to tap the main.

3. Where service pipes have been laid to or inside the curb line, or continued to the cellar foundation of building, for building purposes, a permit will be necessary for any additions thereto.

4. All applications for a permit for a tap must be made before opening the street. The company may refuse to grant a permit for a tap in the main to any plumber who fails to obtain such permit before opening the street for that purpose.

5. Under no circumstances will one tap and one service pipe be allowed to connect with and supply more than one house on streets or avenues where mains are laid.

6. Whenever two or more parties are supplied from one pipe connecting with the main, the failure on the part of either of said parties to pay the water rent when due the company reserves the right to shut off the whole line without liabilities for damages or rebates to those who may have paid promptly or in advance.

7. No street washer or garden hydrant shall be used for the purpose of washing wagons, without extra payment for the same.

8. In all cases where from necessity a trench is left open during the night, a lighted lantern shall be placed by the plumber over such trench from twilight until daylight, and the trench properly railed in.

The company will tap the main ; all work from the tap may be done only by a plumber who is licensed by this company.

The company reserve the right to decline to connect with plumbing which has not been examined and approved by the Superintendent.

The strength of the pipes used, their protection against freezing, the kinds of faucets and other fixtures and the general arrangement of the work in reference to its security and safety, are to be subject to approval by the Superintendent.

Persons taking water must keep their water pipes and all fixtures connected therewith in good repair and protected from frost at their own expense. They must provide a stop and waste-cock, to be properly located inside the building, and have the pipes so arranged that the water can be drawn from them wherever and whenever there is danger of its freezing.

No alterations in pipes or fixtures shall be made, and no additional fixtures put in, without notice to the company, and a permit having been obtained therefor. The only exception to the above will be in cases where pipes have burst and damage to the premises is likely to result from any delay in making the application.

No person shall be entitled to damages, nor to have any portion of a payment refunded, for any stoppage of supply occasioned by accident to any portion of the works ; nor for stoppage for purposes of additions or repairs ; nor for non-use occasioned by absence ; and the company shall have the right to shut off water to make repairs or additions of new work.

No hydrant, horse-bib or hose attachment shall be placed in any yard or area of any premises so situated as to be accessible to persons living in or occupying neighboring premises, unless the owner of the premises first named becomes responsible for and pays the water rent for all persons using water therefrom, and under no circumstances will any private hydrant or goose neck be allowed to be placed in the public streets.

In all premises every private fountain, water-closet, set-basin, sink or other fixture, whether used or not, will be deemed and held as used, and will be charged for so long as such fountain, water-closet, set-basin, sink or other fixture shall remain connected with the water pipes.

No water taker will be allowed to supply water to parties not entitled to its use, except by special permit from the company, and if found doing so without a permit, the supply will be stopped, and the water rent already paid forfeited.

There shall be no concealment of the purpose for which water is used.

There shall be no unnecessary waste of water. Any person violating this rule shall be liable to have his supply of water shut off, and the amount paid therefor forfeited.

The company, their agents and assistants reserve the right to enter the premises of any water taker that is supplied with water, at all reasonable hours of the day, to wit: between eight o'clock A. M. and six o'clock P. M. to examine the pipes and fixtures, the quantity of water used and the manner of its use.

### METERS.

Meters are prohibited in private or tenement houses.

Water will be served to ferries, railroads, factories, etc., by meter or special contract at rates to be agreed upon.

If a meter gets out of order and fails to register, the consumer will be charged at the average daily consumption as shown by the meter when in order. Repairs of meters will be made by the company at the expense of the owners, whenever the company deems repairs necessary.

All water that passes through a meter will be charged for, whether used or wasted.

All meters will be set by an employee of the company, and shall not be moved or disturbed without permission from the proper officer.

### STREET SPRINKLERS AND STREET SPRINKLING.

No person or persons shall be permitted to take water from the fire-hydrants or street sprinkler's hydrants to sprinkle any of the streets, or portions of the streets, or for any other purpose, without having obtained a permit from the company, which permit shall be good only for the time named therein.

In taking water for street sprinkling purposes no leakage or waste of water, either from street sprinkler, hose, ar sprinkling cart will be tolerated; and all persons using the sprinklers shall leave them properly protected.

### PAYMENT OF BILLS.

1. All water rates are payable in advance, at the office of the company, during the month of May in each year, and prompt payments are required from consumers as a condition of continued supply.

2. Fractional parts of a year will be calculated from the date on which the tap is made to the first day of May next ensuing, and will be payable as soon as the water is let on.

3. Section 2 applies only to premises which are about to connect with the water-mains of the company, and does not in any way apply to premises which are connected.

4. Bills for measured and estimated water are payable monthly.

5. If bills are unpaid twenty days after due, the water may be shut off without further notice.

6. The owners of dwelling houses, hotels, manufactories, and all other places which are connected with the mains of the Staten Island Water Supply Company, shall be deemed and held personally responsible for the payment of the water rent for each and every year, commencing from May 1, and in default of payment the water may be shut off at the option of the company and not turned on again until the expense thereof, $3, and on county roads, $6, and the annual rate be paid in full.

7. All connections made with the water-mains will be for not less than one year.

8. The annual water rate to be charged is regulated by the fixtures for the use of water which may be on the premises.

9. All fixtures that are connected with the mains of the water company will be charged for, whether used or not.

10. The water rate or tax commences and dates from the day on which the tap is made (excepting only for building purposes) and does not cease as an annual rate or tax from that date, whether the premises are occupied or not.

11. Water will be shut off by our agents or employees only for non-payment of water rate or violation of rules, and any consumer who may desire the water shut off temporarily from his premises should send for a plumber to do the same.

12. No water taker will be allowed to supply water to parties not entitled to its use, and if found doing so the supply will be stopped, and the water rent already paid forfeited.

13. The company will make such revisions in their rates and regulations as time and experience shall show to be advantageous for themselves and their customers.

### NOTICE TO PLUMBERS.

1st. An application in regular form must be made by all plumbers, when a tap is wanted, and a return in regular form, giving the full name of the owner, filled out for the work to be done.

2d. All applications for taps and the returns for the same must be made out and placed on file at the office of the Water Supply Company before a tap will be made.

3d. All taps must be paid for when application is made.

4th. When application is made for a tap for building purposes the full name of the owner, the full name of the builder and the estimated number of barrels of lime or cement to be used to complete the building or buildings, must be given on the returns, and the number of barrels must be paid for, at the rate of six cents per barrel, by either the plumber or builder before any tap will be made.

5th. All plumbing work required in a building must be completed and service run to the stop-box at the curb before making application for a tap.

6th. No tapping will be done before 1 o'clock P. M. All applications for taps must be made before 12 M. All applications made after that hour will positively receive no attention until the following afternoon, and no tapping will be done on a Saturday.

7th. All connections to corporation taps must be of lead and not less than 4 feet in length, exclusive of coupling, size and weight as follows:

For ½ tap ¾-inch lead pipe, weighing not less than 3½ pounds per foot.

For ⅝ tap ¾-inch lead pipe, weighing not less than 3¾ pounds per foot.

8th. All service beyond the sidewalk must be connected by stop-box at the curb, and stop and waste inside the foundation walls.

The tapper will see that the above rules are complied with before tapping the main.

Stop-cocks must conform in size and weight to those adopted by the company. Galvanized pipe shall be used for services.

All connections to galvanized-iron pipe must be made with brass soldering nipples; no cup joints allowed under any circumstances.

Any plumber wishing to do business in connection with the Staten Island Water Supply Company will be required to procure a license from the Superintendent of the company by executing a bond, with one or more sureties to be approved by said Superintendent, in the sum of five hundred dollars, conditioned that he will idemnify and save harmless the company from all suits and actions brought against it or any officer of the company, for, or on account of, any injuries or damages received or sustained by any person by said plumber, his servants or agents, doing any work, or by, or in consequence of, any negligence in guarding the same, or any improper materials used therein, or by, or on account of any act, or omission, of said plumber or his agents. Said plumber shall faithfully perform the work in all respects, and shall also replace and restore the street and gutter pavement over every opening to as good condition as he found it; and keep and maintain the same in good order, to the satisfaction of the company, for the space of six months thereafter; and shall also comply in all respects with the rules and regulations established by the company. All licenses shall expire the 31st day of May next ensuing the date thereof.

No licenses will be granted to persons other than practical plumbers, or those who employ practical plumbers to do their work. Plumbers shall state their place of business, together with the name under which their business is done, for record, at the time of taking out licenses, and shall immediately notify the company of any change in either.

Plumbers shall make full written returns of the ordinary and special uses for which the water is to be used under the permit granted, whether of new work, alterations or additions, with a full description of all apparatus and arrangements for using the same, the return to be made within forty-eight hours after attachment with the several pipes, or completion of alterations or additions. In case of the suspension of any part of the contemplated work for any cause it shall be the duty of the plumber to make a return of the work so far as completed on blanks furnished by the company. No plumber or other unauthorized person will be allowed to turn on water.

No person, unless specially authorized by the company, will be permitted to tap or make any connection with the main or distribution pipes.

All work in the street must be done in the best manner, so as to protect the public against injury. The company may repair work which is not satisfactory, after three days' notice, and collect the cost from the plumber doing the work.

The company and their agents are to have at all times facilities for inspecting the plumbing, fixtures or other work under the charge of the plumber.

No plumber having a license from the company will be allowed to take out a permit for work to be done by a person not in his employ.

The company shall have the right to impose a fine, not exceeding the sum of ten dollars, for each violation of rules and regulations.

Violations of rules and regulations, or the conditions under which a license is taken, will subject the plumber to forfeiture of his license, or to a fine, or both, as well as to the penalties of his bond.

The foregoing is subject to change without notice.

MARCH, 1898.

By order of the Board of Directors.

H. BRIGHTMAN, President.

J. S. WARDE, Superintendent.

## RATES AND RULES OF THE WOODHAVEN WATER SUPPLY COMPANY, WOODHAVEN, N. Y., NOVEMBER 1, 1894.

(New York office, No. 19 Cliff street).

### SCALE OF WATER RATES.

(Per annum).

| FRONT WIDTH. | STORIES IN HEIGHT. | | | | |
|---|---|---|---|---|---|
| | One. | Two. | Three. | Four. | Five. |
| 16 feet and under | $4 00 | $5 00 | $6 00 | $8 00 | $9 00 |
| 18 and over 16 feet | 5 00 | 6 00 | 8 00 | 9 00 | 11 00 |
| 20 and over 18 feet | 6 00 | 8 00 | 9 00 | 11 00 | 12 00 |
| 22½ and over 20 feet | 8 00 | 9 00 | 11 00 | 12 00 | 13 00 |
| 25 and over 22½ feet | 9 00 | 11 00 | 12 00 | 13 00 | 14 00 |
| 30 and over 25 feet | 11 00 | 13 00 | 14 00 | 15 00 | 16 00 |
| 37½ and over 30 feet | 13 00 | 15 00 | 17 00 | 19 00 | 20 00 |
| 50 and over 37½ feet | 17 00 | 18 00 | 19 00 | 20 00 | 21 00 |

All rear tenements or any lot or lots, with front buildings thereon, shall pay an annual regular rate of one-half the regular rate fixed by the foregoing subdivisions for front buildings of similar height and width; but this provision shall not apply to tenements erected on corner lots, each of which tenements shall pay the regular rates as stated in the above subdivisions.

Rates are payable annually in advance, on the first day of November. If not paid within thirty days after said date, interest will be added at the rate of 6 per cent. per annum until paid, and to the disconnection of the service, at the option of the company, without notice.

## SPECIAL OR EXTRA WATER RATES

as follows are due and payable in advance; default in payment within the prescribed time subjects the entire premises wherein the water is furnished to be disconnected without notice.

### *Sidewalk Washers.*

For each washer, for washing windows and sidewalks, the sum of $2 per annum. A permit for a sidewalk washer gives authority to wash sidewalks of the premises for twenty-five feet only; if used beyond that distance an extra rate will be required to be paid upon the property upon which the water is used. The use of a hose bib for the purpose of a sidewalk washer is prohibited, unless a special permit therefor is obtained.

### *Hose.*

When hose is used for garden purposes an additional charge of $2.50 per twenty-five foot lot will be made.

### *Water-closets.*

Each private house is entitled to one water closet and one bath without charge; for each additional water-closet $2 per year, and for each additional bath $3 per year.

### *Baths.*

Baths in public houses, boarding houses, barber shops and boarding schools from $5 to $25 each, at the discretion of the company.

### *Large Buildings.*

Churches, public schools, institutions, greenhouses, factories, railroads, storage, etc., shall be subjects of special contract with the company; and all large buildings with stores or offices on the ground floor, and halls or offices above, shall rate the same as though each store or subdivision on the ground floor front was, with the building above, a separate building.

### *Manufacturing Purposes.*

All water used for manufacturing purposes shall be subject to special contract.

### *Bakeries.*

For every barrel of flour or meal used, the sum of 1 cent per barrel.

### *Barber Shops.*

Each wash-basin, $3.

### *Bars and Drug Stores.*

$5 to $25 each, according to use.

### *Boarding-schools.*

Boarding-schools shall be charged at the rate of from $15 to $50 each, and private schoolhouses at the rate of from $10 to $20 each per annum.

### *Fountains.*

Fountains ordinarily used three hours per day, for a period of not more than four months in the year, shall be charged as follows: A one-sixteenth of an inch jet, the sum of $7 per annum; for a one-eighth of an inch jet, the sum of $15 per annum; for a one-quarter of an inch jet, the sum of $40 per annum; for a one-half inch jet, the sum of $90 per annum; for an inch jet, the sum of $200 per annum. No fountain shall be permitted on any premises where the water is not taken for other purposes and to an extent sufficient for those purposes; and if the water from the jet or fountain be permitted to flow into premises adjacent to, or in the neighborhood, where it may be used for other purposes, the supply shall be stopped and the amount of payment forfeited.

### *Cow and Cattle Stables.*

For each and every cow or head of cattle, the sum of 75 cents, and for hogs, 25 cents each per annum.

### *Private Horses.*

For each horse, $2.50 per annum, with privilege to wash carriages used in such stable.

### *Livery Horses.*

For each horse $2 per annum. Railroad and omnibus horses the same rate.

### *Cart and Other Work Horses.*

$1 each per annum.

### *Horse Troughs.*

For each trough on sidewalk (which must be made to conform to Company's order), the sum of $5 per annum.

### *Hotels and Boarding-houses.*

Hotels and boarding-houses shall, in addition to the regular rate for private families, be charged for each lodging room at the discretion of the company, and not less then $1 for each additional bed over those used by the family.

### *Taverns, Saloons, etc.*

Taverns, saloons, etc., shall be charged an extra rate of from $5 to $30, at the discretion of the Company.

### *Slaughter-houses.*

Slaughter-houses shall be charged at the rate of from two to three hundred dollars each per annum.

### *Building Purposes.*

Rates $6 to $25, at the discretion of the Company.

All matters not herein mentioned are reserved for special contract by the company.

THE WOODHAVEN WATER SUPPLY CO.

## RULES.

1. All applications for water must be made in writing by the owner or agent of the premises to be supplied, stating fully and truly all the purposes for which it is to be used ; and should additional use at any time be required, the company must be notified thereof before such additional use will be allowed, and when paying annual charges parties must frankly and without concealment answer all questions relating to its consumption.

2. Persons taking water must keep their own water-pipes and all fixtures connected therewith in good repair and protected from frost at their own risk and expense. They must provide a stop and waste-cock, to be properly located inside the building, and have the pipe so arranged that the water can be drawn from them whenever there is danger of its freezing.

3. The water at wash-basins, water-closets, urinals, baths, or any other places must not be left running to prevent the water in the pipes from freezing or for any other purpose, and all unnecessary waste of water must be prevented. Water-closets and urinals must in all cases be self-closing.

4. All house boilers shall be constructed with one or more air holes near the top of the inlet pipe, and be of sufficient strength to bear the pressure of the atmosphere under vacuum. The service-pipes, stop-cocks and other appurtenances must be sufficiently strong to bear the pressure and ram of the water ; and it is expressly stipulated by the company that no claim shall be made against it by reason of the breaking of any service-pipe or service-cock, or from damage arising from shutting off water to repair mains, or for any cause when circumstances require it. In case of failure upon the part of any consumer of water to repair any leak occurring upon the service-pipe within twenty-four hours after verbal or written notice has been served upon the premises, the water shall be shut off from the same, and will not be turned on until the sum of five dollars has been paid, together with such additional fine or charge as the company may impose. When the waste of water is great, or when damage is likely to result from the leak, the water will be turned off if the repair is not proceeded with immediately upon service of the notice.

5. Street sprinklers and garden hydrants must not be allowed to run to waste, nor be converted into jets, nor used for washing the gutters of the streets ; neither shall they be used for sprinkling or washing the premises of adjoining or opposite proprietors or occupants, or in any other way or for any purpose not authorized by the terms agreed upon with the company.

6. No permits will be granted for street or garden washers or post-hydrants unaccompanied with inside use.

7. The use of sidewalk washers and garden hose will not be permitted between the hours of 8 A. M. and 6 P. M.

8. When two or more parties or families are supplied with water from the same service-pipe, and if either of said parties fail to pay the water rent when due, or to comply with the rules, said company shall have the right to withhold all supply until such rent be paid or the rules complied with.

9. No owner or tenant will be allowed to supply water to other persons or families without the consent of the company, except in some unexpected emergency.

10. No person or persons not authorized by the company shall connect or disconnect, or take apart, or in any way change or cause to be changed, or interfere with the action or regulation of a water meter or tap the mains. The company does this work at reasonable rates.

11. No person will be allowed under any circumstances to make any addition or alteration whatever in connection with any water pipe without the permission, in writing, of this company. This rule will be strictly enforced, and if violated, the supply will be instantly shut off.

12. The penalty for violation of any of the rules and requirements of the company will be the prompt stoppage of the supply of water.

13. In all cases where the water has been turned off for non-payment of water rent or for violation of any rule, it shall not be turned on again until the charge of five dollars be paid for expenses and default, together with such fine as may have been imposed by the company, or rent that may be due, and a satisfactory understanding with the party that no future cause of complaint shall arise. If it is found that the water has been turned on again without having complied with the above requirements, it shall be lawful for the company to cause the ferrule to be drawn ; and it shall not be inserted again until all back rents are paid up, and five dollars additional for drawing and replacing ferrule.

14. The representatives of the company must have free accesss, at all proper times, to all parts of the premises where the water is delivered and consumed.

## TO PLUMBERS.

No permit will be granted for tap or alterations in plumbing work, unless application therefor be made in writing, signed by the plumber ; the application to designate the size of the tap, the size and kind of service pipe to be used, the street and number (if any) ; which side of the street ; if on the corner, on which street to be tapped, with a diagram of the property to be supplied from the service pipe, showing the streets on all sides of the block on which it is situated, with the distance from the nearest corner, the full name of the owner, the purpose for which the water is to be used, and all other particulars necessary to a full understanding of the subject. Also state what plumbing work is in the house at the time this application is made ; and a detailed statement of the proposed alteration.

Plumbers not complying with any of the rules, will thereafter be refused permits.

## APPLICATION FOR WATER.

Application is hereby made to The Woodhaven Water Supply Company to supply

.................................................................................................. } Give Exact Location.
..................................................................................................

with water for the term of..............................and from year to year until further notice in writing for the following purposes, subject to their Rates and Rules, as per copy herewith, dated, Nov. 1, 1894 ; receipt of which is hereby acknowledged.

.............................................................................................

.............................................................................................

.............................................................................................

Dated............................189

No..............          ............................................ } Applicant Sign here.

Distance from House to Main................................

" " Tap to Sides of House..........................

RULES, REGULATIONS AND TARIFF OF RATES OF THE QUEENS COUNTY WATER COMPANY, FOR THE USE OF WATER IN QUEENS COUNTY, N. Y., INCLUDING RULES REGULATING THE PLUMBING OF HOUSES—JANUARY 18, 1892.

FAR ROCKAWAY, N. Y., January 18, 1892.

The Queens County Water Company, recognizing the necessity for uniform rating, has adopted the following rules, regulations and tariff of rates, for the guidance and governance of all persons using the water served by this company. The company desires, as far as may be possible, not to interfere with the rates and agreements for water that have been previously established, and in consequence will permit all rates to remain as they have been heretofore, until further notice, unless the consumers, individually, desire to be rated under the new schedule; any consumer who may so desire, will, upon application to the company, be rated as per the schedule of rates herein given. Meters will be furnished on the request of the consumers or at the option of the company.

All new consumers will be charged the new rates, as shown in the schedule, subject to such modifications or additions as may be made by the company, from time to time.

### MEMORANDA.

One cubic foot is equal to nearly seven and one-half gallons. The amount of water which can be obtained through different sizes of pipe depends upon the head or pressure, which will vary in different parts of the district, and the delivery per hour, when metered, with service-pipes of the usual length, will be approximately as follows:

| Size of Pipe. | | Average Delivery, Gallons per Hour. |
|---|---|---|
| ½ | inch | 250 |
| ⅝ | " | 450 |
| ¾ | " | 900 |
| 1 | " | 1,800 |
| 1½ | " | 2,700 |
| 2 | " | 3,600 |
| 3 | " | 8,100 |
| 4 | " | 27,000 |

*Annual Water Rates for Buildings not Metered—Approved January* 18, 1892, *by the Queens County Water Company.*

| FRONT BUILDINGS. | ONE-STORY. | ONE AND ONE-HALF-STORY. | TWO STORY. | TWO AND ONE-HALF-STORY. | THREE STORY. | THREE AND ONE-HALF-STORY. | FOUR STORY. | FOUR AND ONE-HALF STORY. | FIVE STORY. |
|---|---|---|---|---|---|---|---|---|---|
| Fifteen and under 20 feet in width | $7 00 | $8 00 | $9 00 | $10 00 | $11 00 | $12 00 | $13 00 | $14 00 | $15 00 |
| Twenty and not exceeding 25 feet in width | 9 00 | 10 00 | 11 00 | 12 00 | 13 00 | 14 00 | 15 00 | 16 00 | 17 00 |
| Exceeding 25 and not exceeding 30 feet | 11 00 | 12 00 | 13 00 | 14 00 | 15 00 | 16 00 | 17 00 | 18 00 | 19 00 |
| Exceeding 30 and not exceeding 40 feet | 13 00 | 14 00 | 15 00 | 16 00 | 17 00 | 18 00 | 19 00 | 20 00 | 21 00 |
| Exceeding 40 and not exceeding 50 feet | 15 00 | 16 00 | 17 00 | 18 00 | 19 00 | 20 00 | 21 00 | 22 00 | 23 00 |
| Exceeding 50 and not exceeding 60 feet | 19 00 | 20 00 | 21 00 | 22 00 | 23 00 | 24 00 | 25 00 | 26 00 | 27 00 |
| Exceeding 60 and not exceeding 70 feet | 22 00 | 23 00 | 24 00 | 25 00 | 26 00 | 27 00 | 28 00 | 29 00 | 30 00 |
| Exceeding 70 and not exceeding 80 feet | 26 00 | 27 00 | 28 00 | 29 00 | 30 00 | 31 00 | 32 00 | 33 00 | 34 00 |
| Exceeding 80 and not exceeding 90 feet | 30 00 | 31 00 | 32 00 | 33 00 | 34 00 | 35 00 | 36 00 | 37 00 | 38 00 |
| Exceeding 90 and not exceeding 100 feet | 34 00 | 35 00 | 36 00 | 37 00 | 38 00 | 39 00 | 40 00 | 41 00 | 42 00 |
| Exceeding 100 and not exceeding 110 feet | 38 00 | 39 00 | 40 00 | 41 00 | 42 00 | 43 00 | 44 00 | 45 00 | 46 00 |
| Exceeding 110 and not exceeding 120 feet | 42 00 | 43 00 | 44 00 | 45 00 | 46 00 | 47 00 | 48 00 | 49 00 | 50 00 |

Basements where water is used will be rated as stories.

Water rents on all buildings must be paid as rated in the foregoing lists where the water is introduced or used.

### NOTICE TO CONSUMERS.

Water rates for buildings not metered are due and payable annually on the 1st day of June for the year beginning on that day.

Measured water bills are due and payable quarterly on the 5th days of December, March, June and September, except when by consent of the company they are made payable monthly on the 5th day of each month. Office hours from 4 to 6 P. M. daily, excepting Sundays. Bankable money only will be received. Minimum rates payable in advance.

Water takers must prevent all waste of water, protecting their pipes, etc., from frost; allow full inspection at all times; notify the company before making any addition to their plumbing, or alteration thereof, and get a permit for the same through a licensed plumber.

Those failing to pay for the water consumed within the periods specified, or otherwise not complying with the regulations of this company, will, after five days' notice, have their supply cut off.

### EXTRA RATES.

*(In addition to building rates for buildings not metered).*

Section 1. Baths—Three dollars and fifty cents each per annum. One extra allowed without additional charge in houses occupied by only one family.

Sec. 2. Bars and Saloons—Ten dollars to twenty-five dollars each per annum.

Sec. 3. Building Purposes—Twenty-five cents per thousand brick laid. Twenty-five cents per hundred cubic feet of stone masonry. Twenty-five cents per hundred square yards of plastering. All expenses of tapping main and making connections for the service of water for building purposes must be paid in advance by the consumer.

Sec. 4. Fire Hydrants—For other uses than for the extinguishment of fires will be charged at the rate of five cents per minute, and shall be used only by special permit; no charge to be less than one dollar.

Sec. 5. Fountains—One-sixteenth-inch jet, $15 per annum ; one-eighth-inch, $30 for season of four months.

Sec. 6. Greenhouses and Conservatories—Five dollars per thousand square feet of surface covered per annum.

Sec. 7. Horse Troughs and Hydrants (on sidewalks)—Twenty-five dollars per annum. Each trough to be fitted with a proper ball cock to prevent waste. This must be kept in order.

Sec. 8. Hose—When held in the hand for sprinkling purposes $5 per annum per each lot not exceeding 5,000 square feet. Automatic or revolving sprinklers $20 each per annum. Hose and sprinklers may be used between the hours of 5 and 8 o'clock in the morning and 5 and 7 o'clock in the evening unless the service is metered in which case they may be used at any time. Hose use is not included in the charge for houses or for domestic service. Hose will be charged in all cases where there are hose bibs or hydrant spouts with hose screws thereon or other means of attaching to the hose. Consumers not desiring to use hose must have the screws removed.

Sec. 9. Steam Engines and Boilers—Five dollars per horse power for each nominal horse power or by meter.

Sec. 10. Stables—In addition to regular building rates $1 per annum for each horse or cow in excess of two.

Sec. 11. Water-closets and Urinals—Two dollars and fifty cents each per annum. One extra will be allowed without charge in all houses occupied by one family only. Only self-closing water-closets and urinals will be allowed. All others, $15 each per annum.

Sec. 12. No deduction will be made from the rates on account of fixtures not being used ; if not wanted they should be disconnected from the pipes, and upon the same being reported in proper form to the company further charge for their use will be discontinued.

Sec. 13. No alteration or extension shall be made in any water pipe or fixtures without first giving notice of such proposed alteration or extension, and receiving a permit from the company authorizing the same, and the work must be done by a licensed plumber.

Sec. 14. Meters will be loaned by the company, but must be attached by the consumer, for any business requiring a large amount of water.

## METERS.

Sec. 15. At the option of the company, meters will be used, and the water charged for, either at the foregoing rates or at the following meter rates, such rates varying with the amount used, from a maximum of 50 cents per 1,000 gallons to a minimum of 25 cents per 1,000 gallons, the rates decreasing as the amount used is increased; such meter rate to be in full payment of building rates for the premises where such water is used.

Sec. 16. Until further notice, this company will lend a meter, free of charge, and keep the same in repair, except in case of misuse or damage by frost, in which case the expense of repairs must be borne by the consumer.

The company will replace meters damaged by frost only on receipt of $10 to cover the cost or expense of making necessary repairs. When the amount of such expense is ascertained, the balance, if any, will be returned to the consumer.

### *Meter Rates.*

Sec. 17. When the consumption of water is—

First, 50,000 gallons, at 40 cents per 1,000 United States gallons.
Next, 200,000 gallons, at 30 cents per 1,000 United States gallons.
Next, 200,000 gallons, at 25 cents per 1,000 United States gallons.
All over 450,000 gallons, at 20 cents per 1,000 United States gallons.
Final adjustments will be made on the first day of June.

The regular quarters shall commence on the first days of December, March, June and September.

No bill will be rendered or payment accepted for less than the following minimum rates:

| | | | | |
|---|---|---|---|---|
| Through | ½-inch | meter | $10 00 | per annum. |
| " | ¾ | " | 15 00 | " |
| " | 1 | " | 20 00 | " |
| " | 1½ | " | 30 00 | " |
| " | 2 | " | 40 00 | " |

These minimum rates are payable in advance (see below Paragraphs 6 and 7, "Agreement and Conditions.")

Sec. 18. The company reserves the right—

To set meters at any time.

To shut off water without further notice whenever bills remain unpaid for ten days after they are due, or where there is a misuse or waste of water.

To decrease or temporarily discontinue water for business purposes or hose use whenever, in times of drought, the whole supply is needed for domestic purposes, and to meet the conditions of its contracts with the municipal authorities.

To decline to connect with plumbing which has not been examined and approved by the Superintendent.

To decline to continue to supply any consumer unless his service-pipe has a separate stop-cock in the street which is accessible, and which is protected with a proper box and cover.

To add to or modify its rules at any time.

## RULES AND REGULATIONS AS TO PLUMBING.

1. No person except the tapper employed by the company will be allowed, under any circumstances, to tap the mains or distributing pipes, or insert stop-cocks therein; and no plumbing connected with the mains of this company shall be done without a permit from this company.

2. Every plumber, at the time of receiving his license, shall execute and deposit in the office of the company a bond, with two or more sureties, to be approved by the President of the company, in the sum of $1,000, conditioned that he will pay all moneys due to the company for fines and otherwise; that he will indemnify and save harmless the company from all accidents and damages consequent thereupon, for or by reason of any openings in any street, road, lane, avenue, boulevard, alley or court, made by him or by those in his employ for the purpose of putting down or inserting any service pipe or pipes, hydrant or other apparatus for the introduction and use of water furnished by the Queens County Water Company, or for any other object or purpose whatever; that he will replace and restore the street and pavement or loam or macadam surface over every such opening to as good a state and condition as he found it, and keep and maintain the same in good order, to the satisfaction of the company, for the space of six months thereafter; that he will make true and faithful reports to the company of the situation, number, size and character of all pipes, hydrants, washers, water-closets, baths, and all other work or apparatus for conveying, containing or consuming the water furnished by the Queens County Water Company, made, fixed or inserted by him, or under his direction, within five days after the same shall have been completed.

3. Plumbers applying for permits, whether it be for the introduction of water furnished by the Queens County Water Company, or for the alteration and extension of the arrangements for supplying the same, shall state fully and truly the purpose for which said water is required.

All permits must be paid for at the time of application therefor.

The permit will be authority only for such work as is specified in the application.

4. Special permits must be obtained in writing signed by the company, for the following plumbing work, viz.: Taps in street mains exceeding ¾ inch diameter; service pipe other than extra strong "AA" lead pipe of full weight; fountains, horse troughs, drinking fountains, or hydrants on sidewalks or in yards, either in front or rear of premises.

5. Notice must be given at the company's office by the plumber who is to lay down service pipes, fixing the time when he will have the trench open and ready for the tapper. This notice must be given at least twenty-four hours previous to the time fixed.

6. No licensed plumber will be permitted to transfer his permit to another party, or to sign for an unlicensed plumber.

7. The surface of the street over trenches must be put in good order within forty-eight hours after the tapper has finished his work, and must be kept in good order for the space of six months thereafter by the plumber. In case of his failure so to do, it will be done by the company at his expense.

8. In opening streets, the materials excavated must be so deposited as to cause the least possible obstruction to public travel, and the trench or excavation must not be left open at night, except in case of necessity, when a suitable barricade and lighted lanterns shall be placed around

the said trench or excavation from twilight until the following morning, as a guard against accidents.

9. Plumbers fitting up apparatus for the use of the water of the Queens County Water Company, under authority of any permit issued by the company, shall within forty-eight hours after the work shall have been completed fill up and return to the office of the company a blank form of report furnished for that purpose, showing all the arrangements, both new and old, for using the water of the company upon the premises, giving the block, lot and street number of the premises, the name of the street on which the said premises are located, and such other particulars as the case may require. In case lot or street numbers cannot be ascertained, the distance from the nearest street corner must be given. Each report must state the number and kind of permit authorizing the work.

10. Service pipe must be of extra strong "AA" lead pipe, of full weight, from the street main to the stop-cock at the curb line, and laid at least 3½ feet below the established grade line of the street, with a bend in the form of a trap at or near the main, requiring at least 1 foot of extra length, in such a manner as to prevent rupture by settling.

No pipe shall be used in plumbing houses except "AA" lead pipe, unless a special permit is obtained therefor.

11. All services shall be provided with a side-wasting stop-cock of the same bore as the pipe, which shall be covered with an iron box marked with the number of the permit, leading from the cock to the surface of the sidewalk, and covered with a cover or lid of iron with the word "Water" thereon, and located 1 foot back of the curb line and of a pattern satisfactory to the Water Company.

12. House boilers must be provided with vacuum valves in all new work, and when old boilers are removed and replaced by new ones, and also with a stop-cock to shut off the supply from the boiler.

13. All apparatus for the use of the water of the Queens County Water Company's water shall be subject to the inspection and approval of the company as to pattern, material and workmanship.

14. Plumbers making repairs when the water has been shut off by authority, on account of leak, defect or disuse, shall report in writing to the office of the company that all plumbing work, both new and old, is in complete working order, and pay all attendant expenses, otherwise the water will not be turned on; and no person, whether plumber or otherwise, shall turn on the water until he shall receive permission from the company.

15. Any plumber who shall be guilty of violating any of the rules of the company, shall be immediately suspended and deprived of his license, or subjected to a fine, not exceeding the sum of $25.

16. In all cases where a fine is imposed, the party so fined will be suspended from acting under his license until the fine is paid.

17. The charges for furnishing corporation cocks and tapping mains will be as follows:

| Size of Taps. | Price. |
|---|---|
| ½-inch | $2 50 |
| ⅝ " | 3 00 |

| Size of Taps. | Price. |
|---|---|
| ¾ " | 3 50 |
| 1 " | 4 50 |

18. The meter must be set in line with the service box, in a convenient place, protected with a suitable box, and packed to prevent the meter from freezing.

Couplings must be made up or secured in the meter (especially in case of the inlet opening), without using either red or white lead. Boiled oil will answer the same purpose.

In opening the stop-cock to admit water to the meter, open gradually, leaving some convenient faucet on the outlet side open to permit the air and water to escape.

Meters must not be placed in improper positions, rendering same difficult of access. The proposed location of each meter put in, must be inspected and approved by the proper officer of this company before the said meter is set. Notice may be sent to the office of the company in Far Rockway concerning same.

Plumbers making connections with the street mains of the Queens County Water Company, must insert a draw-off cock between the meter and the house, and a check valve between this cock and the meter, in such manner that the cock and meter may be readily disconnected. A second cock on the main side of the meter will also be required.

Plumbers must have excavated for the tapper a hole 4 feet in length, 2 feet wider on each side than the pipe, and 1 foot in depth below the pipe.

Before any application will be granted, the consumer will sign a blank form containing the following agreement and conditions :

## AGREEMENT AND CONDITIONS.

1. Each consumer will honestly comply with the rules and regulations of the Queens County Water Company, among which are the following :

2. The Superintendent or other proper officer or agent of the company shall have access at all reasonable hours to all parts of the premises to which water is supplied by the company.

3. The said company shall have the right, at any time, to shut off the water, without notice, in any one or more of their mains, in cases of conflagration, for making repairs or extensions, or for other reasonable and proper purposes ; and all consumers having boilers within their premises, not supplied with tanks or cisterns, but depending upon the pressure in the pipes to keep them supplied, are hereby cautioned against the danger of collapse. Risk of damage in all such cases must be exclusively on the consumer. In case of danger, the hot-water faucet should be opened.

4. The said company undertakes. however, to use all reasonable care and diligence to provide a constant supply of water through its pipes to consumers, but in the event of break, failure or accident the said company shall not be liable to any consumer for any damages resulting from the public enemy, the elements, or any accident, misfortune, failure or break in the machinery, reservoirs or pipes of the company.

5. In case of a supply by meter, one meter for each tap will be loaned and kept in repair by said company, without charge to the consumer. If any meter be found defective, it will immedi-

ately be replaced by another meter; and in case of its ceasing to register the quantity of water consumed, the account will be made by an average of another meter, or by the amount charged during a previous corresponding period, at the discretion of the company. The accuracy of a meter can be tested at any time by the consumer, by simply observing whether the meter registers 1 cubic foot when 7½ gallons or 62½ pounds of water are drawn through the pipes.

Consumers will be held responsible if their meters are permitted to freeze, or are damaged otherwise than by ordinary wear and tear. Meters will be furnished at the request of consumers or at the option of the company.

6. After meters are attached, no bill will be rendered or payment accepted for less than the following minimum rates, which must be paid in advance:

| | | |
|---|---|---|
| Through ½-inch meter | $10 00 | per annum. |
| Through ¾-inch meter | 15 00 | " |
| Through 1-inch meter | 20 00 | " |
| Through 1½-inch meter | 30 00 | " |
| Through 2-inch meter | 40 00 | " |

7. The regular quarters will commence on the first days of December, March, June and September, and statements of the amount of water used will be rendered at that time. Final adjustments will be made on June 1, at which time the excess, if any, over minimum rates will become due and payable.

Tapping will be done by the company, at the following prices, which include the corporation cock:

| | |
|---|---|
| ½-inch cock and tapping | $2 50 |
| ⅝-inch cock and tapping | 3 00 |
| ¾-inch cock and tapping | 3 50 |
| 1-inch cock and tapping | 4 00 |

8. And the said application shall also contain the following agreement:

As a further consideration and inducement to said Water Company to supply me with water, I hereby agree for myself, my heirs, representatives and assigns, to sell to the said Water Company, at any time, my right, title and interest in the pipe I may lay from the mains of said company to the point where the said pipe enters my own property, at a fair market value of the pipe, at the time the company decides to take the pipe off my hands, and the actual cost for excavation and refilling, which would be necessary if the company had to lay the pipe itself.

I will also sell and convey to them without additional compensation any right-of-way I may now or hereafter possess enabling me to lay and maintain said pipe, and will keep the said pipe and fixtures in repair until the company shall purchase it.

W. M. MARTIN, President.
GURDON S. BUCK, Secretary and Treasurer.
CHAS. B. BRUSH, Chief Engineer.

F. S. PECKE, Engineer in charge.

THOS. D. SMITH, Superintendent.

All communications should be addressed to the Queens County Water Company, and sent to its office at Far Rockaway, Long Island, New York.

## THE JAMAICA TOWNSHIP WATER COMPANY.

### RULES, REGULATIONS AND CONDITIONS GOVERNING ITS INTRODUCTION AND SUPPLY WITH ANNUAL WATER RATES AND RULES FOR PLUMBERS.

### RICHMOND HILL.

### SCHEDULE OF PRICES OF WATER FOR DOMESTIC AND OTHER PURPOSES.

| | | |
|---|---|---|
| Houses of 9 rooms or over (with all improvements) | $15 00 | per annum. |
| Houses of 6, 7 or 8 rooms (with all improvements) | 12 00 | " |
| Houses of 8 rooms or over (kitchen sink only, hot and cold water) | 8 00 | " |
| Houses of 6 or 7 rooms (kitchen sink only, hot and cold water) | 6 00 | " |
| Houses of 5 rooms or under (kitchen sink only, hot and cold water) | 4 00 | " |

The expression "all improvements," means one bath tub, closet and basin, kitchen sink and set of washtubs and butler's pantry sink. For all additional fixtures the following prices are charged: Bath tub, $3; water-closet, $3; tubs, $2; faucet, $1, but no more than $20 shall be charged for domestic purposes in any one house, and in houses not having "all improvements" the rate for kitchen sink only is charged plus the price of each additional fixture, but not exceeding the price for all improvements.

Lawn sprinkling, not exceeding $0.10 per front of plot sprinkled, nor $0.10 in the aggregate, for four hours' sprinkling per diem.

Water for sprinkling streets not to exceed $0.10 per 1,000 gallons.

All other or special rates not above specified shall not exceed those now charged in the village of Jamaica, nor shall the said Water Company at any time during the period of this contract make or charge any water rates other than those specified in the foregoing schedule, which shall be in excess of the rates then charged for the same accommodations in buildings of the same description in the village of Jamaica.

*Sidewalk Washers.*

For each washer, for washing windows and sidewalks, the sum of $2 per annum. Sidewalk washers shall be used only between the hours of 4 A. M. and 8 A. M., from March 1 to November 1, and from 4 A. M. to 9 A. M. from November to March; nor must they be converted into jets, or the water suffered to run to waste or leak, or used to wash the filth of gutters down upon neighbors or into receiving basins of sewers. A permit for a sidewalk washer gives authority to wash sidewalks of the premises for twenty-five feet only; if used beyond that distance an extra rate will be required to be paid upon the property upon which the water is used. The use of a hose bib for the purpose of a sidewalk washer is prohibited, unless a special permit therefor is obtained. The sprinkling of roadways of streets from sidewalk washers or lawn sprinklers is strictly prohibited. When hose is used for garden purposes an additional charge of $2.50 per twenty-five foot lot will be made. Hose for lawn purposes will only be allowed to be used for two hours before 9 A. M., and between 4 and 6 P. M. Any infringement of this rule will necessitate shutting off the whole supply.

Each private house is entitled to one water-closet and one bath without charge; for each additional water-closet $2 per year, and for each additional bath $3 per year.

Baths in public houses, boarding houses, bathing establishments, barber shops and boarding schools, from $5 to $25 each, at the discretion of the company.

### *Large Buildings.*

Churches, factories, storage, etc., shall be subjects ot special contracts with the company; and all large buildings, with stores or offices on the ground floor, and halls or offices above, shall rate the same as though each store or subdivision on the ground floor front was with the building above a separate building.

All water used for manufacturing purposes shall be charged and paid for at the rate of $100. per 100 gallons, or $0.07½ per 100 cubic feet, meter measurement. All water furnished and used for other purposes shall be charged and paid at the rate of $0.01½ per 100 gallons, or $0.11¼ per 100 cubic feet, meter measurement, provided however, that in cases where an annual supply of water for a given purpose exceeds in cost the sum of one thousand ($1,000) dollars, meter measurement, such supply of water shall be furnished and paid for at the rate charged for manufacturing purposes, to wit: $0.01 per 100 gallons.

## SPECIAL OR EXTRA WATER RATES

as follows: are due and payable in advance; default in payment within the prescribed time subjects the entire premises wherein the water is furnished to be disconnected without notice.

### *Bakeries.*

Special rates will be made.

### *Barber Shops.*

Special rates will be made.

### *Bars and Drug Stores.*

Bars and Drug Stores—$5 to $25 each, according to use.

### *Building Purposes.*

For each building $10.

### *Boarding Schools.*

Boarding schools shall be charged at the rate of from $15 to $50 each, and school-houses at the rate of from $10 to $20 each, per annum.

### *Fountains.*

Fountains, ordinarilly used three hours per day, for a period of not more than four months in the year, shall be charged as follows; A one-sixteenth of an inch jet, the sum of $7 per annum; tor a one-eighth of an inch jet, the sum of $15 per annum; for a one-quarter of an inch jet, the sum of $40 per annum; for a one-half inch jet, the sum of $90 per annum; for an inch jet the sum of $200 per annum. No fountain shall be permitted on any premises where the water is not taken for other purposes, and to an extent sufficient for those purposes; and if the water from the jet or fountain be permitted to flow into premises adjacent to, or in the neighborhood, where it may be used for other purposes, the supply shall be stopped, and the amount of payment forfeited.

### *Cow and Cattle Stables.*

For each and every cow or head of cattle, the sum of 75 cents, and for hogs 25 cents each per annum.

### *Private Horses.*

For each horse, $2.50 per annum, with privilege to wash carriages used in such stable.

### *Livery Horses.*

For each horse, $2 per annum. Railroad and omnibus horses the same rate.

### *Cart and Other Work Horses.*

Cart and other work horses, $1 per annum.

### *Horse Troughs.*

For each trough on sidewalks (which must be made to conform to Company's order), the sum of $5 per annum.

Hotels and boarding houses shall, in addition to the regular rate for private families, be charged for each lodging room at the discretion of the company, and not less than $1 for each additional bed over those used by the family.

### *Market Stalls and Stands.*

Special rates will be made.

### *Porter Houses, Taverns, Etc.*

Porter houses, taverns, etc., that retail liquors, shall be charged an extra rate of from $5 to $30, at the discretion of the company.

### *Refectories and Printing Offices.*

Refectories and printing offices shall be charged at such rates as may be determined in the discretion of the company.

### *Slaughter Houses.*

Slaughter houses shall be charged at the rate of from two to three hundred dollars each, per annum.

All matters not hereinbefore mentioned, are reserved for special contract by and with the company.

## RULES AND REGULATIONS.

(Subject to Additions and Amendments).

1. All applications for the use of water must be made at the office of the company, in the form prescribed, stating fully and truly the various uses to which the water is to be applied.

2. All plumbing in houses must be completed, and service run from the house to the stop-box at the curb, before applying for a permit to tap the main.

3. Where service pipes have been laid to or inside the curb-line, or continued to the cellar foundation of building, for building purposes, a permit will be necessary for any additions thereto.

4. All applications for a permit for a tap must be made before opening the street. The Superintendent may refuse to grant a permit for a tap in the main to any plumber who fails to obtain such permit before opening the street for that purpose.

5. Under no circumstances will one tap and one service pipe be allowed to connect with and supply more than one house on streets or avenues where our mains are laid.

6. Whenever two or more parties are supplied from one pipe connecting with the main, the failure on the part of either of said parties to pay the water rent when due, or to comply with the rules and regulations of the company, shall authorize the Superintendent to stop the supply of water from all on said premises, without any liability whatever ; owners shall be so far responsible for tenants, that new tenants shall not be entitled to a supply until all arrearages on the premises are paid.

7. No street washer or garden hydrant shall be allowed to be used for the purpose of washing wagons without payment for the same.

8. In all cases where from necessity a trench is left open during the night, a lighted lantern shall be placed by the plumber over such trench from twilight until daylight, and the trench properly railed in.

9. The company will tap the main ; all work from the tap to the curb shall be controlled by this company.

10. The company reserve the right to decline to connect with plumbing which has not been examined and approved by the Superintendent.

11. The strength of the pipes used, the protection against freezing, the kind of faucets and other fixtures and the general arrangement of the work in reference to its security and safety, are to be subject to approval by this company.

12. Persons taking water must keep their own water pipes and all fixtures connected therewith in good repair and protected from frost at their own expense. They must provide a stop and waste cock, to be properly located inside the building, and have the pipes so arranged that the water can be drawn from them wherever and whenever there is danger of its freezing. Each consumer must protect their house boilers, either with check or vacuum valve. The company will not be responsible for any damage caused by reason of the water being shut off.

13. No alterations in pipes or fixtures shall be made and no additional fixtures put in without notice to the company and a permit having been obtained therefor. The only exception to the above will be in cases where pipes have burst and damage to the premises is likely to result from any delay in making the application.

14. No person shall be entitled to damages, nor to have any portion of a payment refunded, for any stoppage of supply occasioned by accident to any portion of the works; nor for stoppage for purposes of additions or repairs; nor for non-use occasioned by absence; and the company shall have the right to shut off water to make repairs or additions of new work.

15. No hydrant, hose bib or hose attachment shall be placed in any yard or area of any premises so situated as to be accessible to persons living in or occupying neighboring premises, unless the owner of the premises first named becomes responsible for and pays the water rent for all persons using water therefrom, and under no circumstances will any private hydrant or goose neck be allowed to be placed in the public streets.

16. In all premises, every private fountain, water-closet, set-basin, sink or other fixtures, whether used or not, will be deemed and held used, and will be charged for as long as such fountain, water-closet, set-basin, sink or other fixtures shall remain connected with the water pipes.

17. No water taker will be allowed to supply water to parties not entitled to its use, except by special permit from the company, and if found doing so without a permit, the supply will be stopped, and the water rent already paid forfeited.

18. There shall be no concealment of the purpose for which water is used.

19. There shall be no unnecessary waste of water. Any person violating this rule shall be liable to have his supply of water shut off, and the amount paid therefor forfeited.

20. The company, their agents and assistants, may enter the premises of any water taker that is supplied with water at all reasonable hours of the day, to wit: Between 8 o'clock A. M. and six o'clock P. M., to examine the pipes and fixtures, the quantity of water used, and the manner of its use.

## METERS.

Meters will not be allowed to be set for private dwellings or tenement houses.

All water that passes through a meter will be charged for, whether used or wasted.

All meters will be set by an employee of the company, and shall not be moved or disturbed without permission from the proper officer.

## STREET SPRINKLERS AND STREET SPRINKLING.

No person or persons shall be permitted to take water from fire-hydrants and street sprinklers to sprinkle any of the streets or portions of the streets, or for any other purpose, without having obtained a permit from the company, or their Superintendent, which permit shall be only good for the time named therein.

In taking water for street sprinkling purposes no leakage or waste of water, either from street sprinkler, hose or sprinkling cart will be tolerated ; and all persons using the sprinklers shall leave them properly covered.

Violation of rules relating to sprinkling streets shall be deemed sufficient reason for refusing further permits.

### PAYMENT OF BILLS.

1. All water rates are payable in advance, at the office of the company, during the months of May and November in each year, and prompt payments are required from consumers as a condition of continued supply.

2. Fractional part of a year will be calculated from the date on which the tap is made to the first day of May or November, next ensuing, and will be payable as soon as the water is let on.

3. Section 2 applies only to premises which are about to connect with the water main of the Company, and does not in any way apply to premises which are connected.

4. Bills for measured and estimated water will be payable on demand, according to use.

5. If bills remain unpaid for ten days after due, the water may be shut off without further notice.

6. The owners of dwelling-houses, hotels, manufactories and all other places which are connected with the mains of the Jamaica Township Water Company shall be deemed and held personally responsible for the payment of the water rent for each and every year, commencing from May and November. In default of payment by any tenant or lessee, the same must be paid by the owner thereof, or the water will be cut off from the entire premises, and not turned on again for any occupant until the expense thereof ($3) and the annual rate be paid in full.

7. All connections made with the water-mains will be for not less than one year.

8. The water rate or tax commences and dates from the day on which the tap is made (excepting only for building purposes), and does not cease as an annual rate or tax from that date, whether the premises are occupied or not, until the water is cut off from the entire premises.

9. Water will be cut off by our own agents or employees only for non-payment of water rate or violation of rules, and any consumer who may desire the water shut off temporarily from their premises shall send for a plumber to do the same, the Water Company only shutting off for the causes above mentioned.

10. When cut off for non-payment or violation of rules the expense thereof will be $3, which will be added to the amount due, and will not be turned on again until the same shall be paid in full.

11. No water-taker will be allowed to supply water to parties not entitled to its use, and if found doing so the supply will be stopped and the water rent already paid forfeited.

12. The company will make such revisions in their rates and regulations as time and experience shall show to be advantageous for themselves and their consumers.

## NOTICE TO PLUMBERS.

1st. An application in regular form must be made by all plumbers when a tap is wanted, and a return in regular form, giving the full name of the owner and tenant or tenants, made and filled out for the work done.

2d. All applications for taps and the returns for the same must be made out and on file at the office of the Water Company before any tap will be made.

3d. All taps must be paid for when application is made.

4th. When application is made for a tap for building purposes the full name of the owner, the full name of the builder, and the estimated number of bricks and yards of plaster to be used to complete the building or buildings must be given on the returns, and the amount paid for, by either the plumber or builder, before any tap will be made.

5th. All plumbing work required in a building must be completed and service run to stop-box at curb before making application for a tap.

6th. No tapping will be done before 1 o'clock P. M. All applications for taps must be made before 12 M. All applications made after that hour will positively receive no attention until the following afternoon, and no tapping will be done on a Saturday.

7th. All service beyond sidewalk must be connected by stop-cock at curb, and stop waste-cock inside foundation walls.

8th. The tapper will see that the above rules are complied with before tapping the main.

9th. Such stop-cocks to conform in size and weight adopted by the company. Galvanized pipe must be used for services.

10th. All connections to galvanized iron pipe must be made with brass soldering nipples ; no cup joint allowed under any circumstances.

11th. Boxes for the use of street washers and stop-cocks of pattern approved by the company may be used. A single stop-cock shall not be used as a street washer, and in all cases a street washer, whether used for building or other purposes, must be controlled by a separate stop-cock. Street washers and stop-cock box must be made to conform to samples to be seen in the office of the company. The appurtenances used in the construction of stop-cock boxes and street washers must be subjected to the inspection of the Superintendent before being set.

12th. Any plumber wishing to do business in connection with the Jamaica Township Water Company shall be required to procure a license from the Superintendent of this company by executing a bond with one or more securities, to be approved by said Superintendent, in the sum of five hundred dollars, conditions that he shall indemnify and save harmless this company from all suits and actions brought against it or any officer of said company, for or on account of any injuries or damages received or sustained by any person, by or from said plumber, his servants or agents, in doing any work, or by or in consequence of any negligence in guarding the same, or any improper materials used therein, or by or on account of any act or omission of said plumber or his agents. Said plumber shall faithfully perform the work in all respects, and shall also replace and restore the street and gutter pavement over every opening to as good a state and condition as he found it, and keep and maintain the same in good order, to the satisfaction of said company, for the space of six months thereafter, and shall also comply in all respects with the rules and regulations established by this company. All licenses shall expire the 31st day of May next ensuing the date thereof.

13th. No license will be granted to persons other than practical plumbers, or those who employ practical plumbers to do their work. Each plumber shall state his actual place of business, together with the name under which the business is done, for record at the time of taking his license, and shall immediately notify the Superintendent of any change in either thereafter.

14th. Plumbers shall make full written returns of the ordinary and special uses which the water is designed to be applied under any permit granted, whether of new work, alterations or additions, with a full description of all apparatus and arrangements for using the water in every case; the return to be made by the plumber who obtained the permit within forty-eight hours after attachment with the several pipes, or completion of alteration or additions. In case of the suspension of any part of the contemplated work for any cause, it shall be the duty of the plumber to make a return of the work as far as completed on blanks furnished by the company. No plumber or other unauthorized person will be allowed to turn on water.

15th. No person, unless specially authorized by the company, will be permitted to tap or make any connection with the main or distributing pipes, under penalty of prosecution.

16th. All work in the street must be done in the best manner to protect the public against injury, and to secure good and satisfactory work. The company may repair work which is not satisfactory after three days' notice and collect the cost from the plumber doing the work.

17th. The company and their agents are to have, at all times, facilities for inspecting the plumbing or other work and fixtures while under the charge of the plumber.

18th. No plumber having a license from this company will be allowed to take out a permit for work to be done by a person not in the employ of such plumber.

19th. Permits will be required to be obtained by licensed plumbers for all work done.

20th. The company shall have the right to impose a fine not exceeding in any one case the sum of ten dollars for violation of rules and regulations.

21st. Violations of rules and regulations, or the condition under which a license is taken, will subject the plumber to forfeiture of his license, or to a fine, or both, as well as to the pains and penalties of his bond.

By order of the Board of Directors,

JOHN C. LOCKWOOD, President.

## WATER RATES AS PER CONTRACT BETWEEN THE VILLAGE OF EDGEWATER AND THE CRYSTAL WATER COMPANY OF EDGEWATER, JUNE 1, 1897.

Office, No. 168 Bay street, Stapleton, N. Y.

### SCHEDULE FOR ANNUAL WATER RATES.

### *Dwelling Houses*

| | |
|---|---|
| Occupied by one family, for the first faucet | $7 00 |
| For each additional faucet to be used by the same family | 3 00 |
| Where house is occupied by more than one family, and less than four, one faucet only being used by all, for each family | 6 00 |
| Where a house is occupied by four or more families, and but one faucet is used by all, for each family | 5 00 |
| Where a house is occupied by more than one family the highest rates will be charged for each family having the water carried into their part of the house | 8 00 |
| For the first bath tub | 5 00 |
| When used by more than one family, for each family | 4 00 |
| For each additional bath tub | 2 50 |
| The first water-closet with self-regulating faucet | 5 00 |
| When used by more than one family, for each family | 4 00 |
| Each additional water-closet with self-regulating faucet | 2 50 |
| Urinal with self-regulating faucet | 2 50 |
| One set set-wash tubs, not exceeding three tubs | 3 00 |
| Each additional set-wash tub | 1 00 |
| Where two faucets are used, one for hot and one for cold water, both emptying into one vessel, but one charge will be made for both. | |
| Provided that in no case shall the charge for the use of water by private family, under the foregoing provision of this schedule, exclusive of hose and stable, be more than | 50 00 |

### *Boarding Houses.*

| | |
|---|---|
| For the first faucet | 10 00 |
| Each additional faucet | 1 00 |
| For water-closet, with self-regulating faucet | 8 00 |
| For each additional water-closet with self-registering faucet | 2 50 |
| Urinal with self-regulating faucet | 4 00 |
| Bath tub when used by boarders | 10 00 |
| For each tub in a public bath house or hotel | 12 00 |
| For each water-closet in a public bath house, with self-regulating faucet | 8 00 |

### *Stores, Offices, Etc.*

| | |
|---|---|
| For each tenement occupied as a store, warehouse or office | $8 00 |
| Where two or more such tenements are supplied from the same faucet, each | 5 00 |
| For markets, saloons, workshops, or for purposes not included in any other classification, and not requiring more than an ordinary supply of water, taken from one faucet, from | 8 00 to 25 00 |
| For water-closet or urinal with self-regulating faucet, used by the occupants of one tenement only | 5 00 |
| When used by occupants of more than one tenement, for each tenement | 4 00 |

For each additional faucet one-half the above charges shall be added. All urinals and water-closets, wherever situated, shall be equipped with self-regulating faucets.

### *Private Stables.*

| | |
|---|---|
| For first horse | 5 00 |
| Each additional horse | 3 00 |
| Each cow | 2 00 |

### *Livery, Club and Boarding Stables.*

For not exceeding three horses, the same as private stables.

| | |
|---|---|
| For each additional horse | 2 00 |

### *Truck and Cart Stables.*

For not exceeding three horses, the same as private stables.

Rates for stables include water for washing carriages, omnibuses and cars, without hose.

Where hose is used in any stable, an addition to the above charges will be made of six dollars for the first horse and two dollars for each additional horse. Where any stable contains faucets with hose bib, same rates shall be paid as where hose is used.

### *Hose.*

| | |
|---|---|
| For the right to attach hose of not more than three-eighths inch orifice for washing windows, sprinkling streets or watering gardens (and the use of the same shall be limited to one hour per day), not less than | 10 00 |

### *Steam-engines.*

| | |
|---|---|
| Stationery steam-engines, working not over twelve hours per day, will be charged by the horse-power, as follows: For each horse-power up to and not exceeding ten, the sum of | 7 00 |
| For each horse-power exceeding ten, and not over fifteen, the sum of | 6 00 |
| For each horse-power over fifteen, the sum of | 5 00 |

### *Eating Houses.*

| | |
|---|---|
| Refectories, confectioneries, eating houses, market and fish stalls, provision shops, refreshment and oyster saloons, according to the quantity of water used, will be charged from ........ $10 to | $50 00 |

### *Building Purposes.*

| | |
|---|---|
| For each cask of lime or cement used ........ | 06 |

### *Bakeries.*

| | |
|---|---|
| Bakeries will be charged according to the average daily use of flour, namely, for each barrel per day, the sum per annum ........ | 5 00 |
| Provided, that in no case shall any bakery be charged less than ........ | 10 00 |

### *Hotels and Bar-rooms.*

| | |
|---|---|
| For one faucet behind the bar, per annum ........ | 10 00 |
| For one faucet in bar-room, per annum ........ | 8 00 |
| Additional faucets, per annum ........ | 4 00 |

### *Laundries.*

| | |
|---|---|
| Laundries, per tub ........ | 5 00 |

The company may at any time attach a meter to the service pipe of any consumer, provided that in their judgment an excess of water is consumed or wasted to the detriment of the fire or water service, and in that case the rate for water used by such consumer shall be the meter rates herein prescribed, provided that no consumer shall pay a less sum than ten dollars per annum, and provided further that in case the meter is caused to be set at the instance of the company, the said company shall furnish, place and maintain such meter at its own cost and expense, and without charge to such consumer.

In case any consumer of the Water Company desires to take water by meter, he shall have the privilege of so doing at the meter rates herein prescribed, provided that no such consumer shall pay a less sum than ten dollars per annum, and provided further that the said consumer shall pay a meter rental of three dollars per annum, unless said consumer shall provide and install a standard meter adopted by the company at his own expense, in which event said consumer shall not be compelled to pay a meter rental as herein provided. Said company shall not be required to install a meter unless at least one year's rental shall first be paid.

### MAXIMUM METER RATES FOR WATER.

| | | |
|---|---|---|
| For 8,000 cubic feet per quarter, or less ........ | $3 38 | per 1,000 cubic feet. |
| For 20,000 cubic feet per quarter, or less ........ | 3 00 | " |
| For 33,400 cubic feet per quarter, or less ........ | 2 63 | " |

| | | |
|---|---|---|
| For 66,800 cubic feet per quarter, or less | $2 25 | per 1,000 cubic feet. |
| For 100,000 cubic feet per quarter, or more | 1 88 | " |

## NEW YORK AND WESTCHESTER WATER SUPPLY COMPANY.

The annexed schedule shows the terms at which the New York and Westchester Water Supply Company supplies water to the residents of the territory east of the Bronx river.

There are physical difficulties confronting the project of extending the public water supply owned by the city into the territory east of the Bronx river, which consist of the fact that the final plan of streets and avenues has not yet been established, and that the greater part of the streets now on the map have not been permanently regulated and graded.

Very respectfully,

(Signed) WM. DALTON, Commissioner of Water Supply.

Water rates of New York and Westchester Water Company to consumers:

| | Per Annum. |
|---|---|
| Bakery | $10 to $50 00 |
| Barber shop, first chair | 10 00 |
| Barber shop, each additional chair | 3 00 |
| Bath-tubs, private, each tub | 5 00 |
| Bath-tubs, public | 15 00 |
| Bath-tubs, hotel or boarding-house, each tub | 10 00 |
| Brickyard, each gang | 20 00 |
| Brickwork, per thousand | 10 |
| Billiard saloons, each table | 3 00 |
| Boarding-house, each room | 1 50 |
| Banks | $10 and up. |
| Churches | $10 00 |
| Concrete, per cubic yard | 15 |
| Fountains, six months, 1-16 inch jet, five hours daily | 10 00 |
| Hotels, each room | 1 50 |
| Halls | Not less than 10 00 |
| Hose, per front foot | 10 |
| Hose, corner lots | 15 |
| Ice-cream saloons | 10 00 |
| Livery stables, first horse | 5 00 |
| Livery stables, additional horse | 2 00 |
| Liquor saloon | $10 to $50 00 |
| Laundry | $10 and up. |

| | Per Annum. |
|---|---|
| Machine shop | Special rates. |
| Motor power | “ |
| Oyster saloons | $10 00 |
| Offices | $10 and up. |
| Photograph gallery | “ |
| Printing office | Special rates. |
| Plastering, per square yard | $0 01 |
| Residence, six or less persons | 10 00 |
| Residence, each additional person | 1 00 |
| Restaurants | $10 and up. |
| Schools in public buildings, average number of pupils, each | $0 05 |
| Schools, private, 50 pupils or less | 5 00 |
| Schools, each additional 50 | . 05 |
| Stables, private, for 2 horses or cows | 5 00 |
| Stables, each additional | 1 00 |
| Hose for washing carriages | 5 00 |
| Sprinkling carts, each, per month | 20 00 |
| Shops | $10 and up. |
| Stores | $10 to $30 00 |
| Steam boilers, per horse-power | 3 00 |
| Stonework, per cubic yard | 05 |
| Urinals, private residences | 3 00 |
| Urinals, hotels and boarding-houses | 5 00 |
| Urinals, public offices | 5 00 |
| Urinals, stores | 3 00 |
| Water-closets, private residences | 5 00 |
| Water-closets, each additional seat | 3 00 |
| Water-closets, hotels, first seat | 10 00 |
| Water-closets, hotels, each additional seat | 5 00 |
| Washing bottles | $5 to $25 00 |
| Wash-tubs, stationary | 1 00 |
| Wash-hand basins, stationary | 3 00 |
| No license less than | 10 00 |
| Meter rates, per 100 cubic feet | 15 |
| Meter rates for larger quantities | By special contract. |

CITIZENS' WATER SUPPLY COMPANY.

ELMHURST, BOROUGH OF QUEENS, NEW YORK CITY,................, 189

The undersigned hereby requests the Citizens' Water Supply Company to supply with water the premises owned by......................at.......................................... on the............side of.................................between...................... and.......................................and to supply the necessary meter and to extend the service-pipe to the curb-line in front of those premises.

In consideration of the above request being granted..........hereby agrees to comply with the following rules and regulations which are hereby admitted to form a part of this agreement.

### RULES AND REGULATIONS.

Upon payment of the tapping and meter in advance, the company will insert tap and furnish the necessary connections, when notified that excavation is ready.

The applicant shall connect to the curb stop by means of a lead goose-neck not less than 18 inches long with a wave of at least six inches.

No black iron pipe shall be used between the curb-stop and the meter.

Wherever lead pipe is used on the street side of the meter it shall be not less than the following weights:

½-inch, 2 pounds to the foot.
¾ inch, 3½ pounds to the foot.
⅝-inch, 2¾ pounds to the foot.
1-inch, 6 pounds to the foot.

A stop of suitable pattern shall be set by the consumer on the service-pipe within the building between the meter and the street.

The company will supply the soldering unions for the meter. In case iron pipe is used in the building, one of those unions shall be connected to a lead goose-neck as for the curb-stop and connected to the service-pipe. This being done and the company notified, the meter will be connected in by the company.

Whenever a meter must be set out doors, it shall be set in a pit not less than two and one-half (2½) feet wide by four (4) feet long, suitably lined to prevent the earth from caving in. Provision for the meter must be made at the end of the pit nearest the house and the consumer's stop set within the pit at the street end. Such pits must be kept dry and clean by the consumer.

Bye passes around meters shall in no case be made.

Provision for setting the meter must be so made that it will be readily accessible for inspection and repairs.

A meter once set shall not be disconnected except by an employee of the company.

The company will keep the meter in repair in so far as ordinary wear and tear is concerned, for the term of five years from the time of its purchase. All damages to the meter through frost, heat, accident or design will be repaired by the company at the cost of the consumer.

In case of dispute as to the accuracy of a meter, it will be tested upon application of the consumer and if not found to register against said consumer the latter will pay a testing fee of $1.50.

The company reserves the right to take out and test meters, without cost to the consumer, whenever doubt exists on the part of said company as to the accuracy of the meter.

Should the meter fail to register properly the charge for water will be based on the average consumption either prior or subsequent to the failure of the meter.

All water passing through the meter, whether consumed, or wasted through leaks or defective fixtures, will be paid for at the following rates :

For the first 1,000 cubic feet consumed in each six months, 30 cents per 100 cubic feet or 750 gallons.

For the second 1,000 cubic feet consumed in the same period, 20 cents per 100 cubic feet or 750 gallons.

For quantities in excess of 2,000 cubic feet up to 98,000 cubic feet in the same period, 10 cents per 100 cubic feet or 750 gallons.

All water rents are payable at the office of the company within fifteen (15) days from the date of the bill. If not paid within thirty (30) days from the date of the bill, the company may discontinue the service upon twenty-four (24) hours' notice and the service will not be resumed except upon payment of all arrearages plus five dollars cost for turning the water off and on.

Charges for water supplied will be made against the owners of the premises who will be held responsible for all amounts due for water so supplied.

No consumer will be supplied with water for less than six dollars per annum, irrespective of the amount used. Taps will be inserted only with that understanding.

No part of the water supplied to the premises for which the application is made shall be sold or supplied to other premises for which the application is made shall be sold or supplied to other premises or parties except under a written permit from the company.

The authorized agents of the company shall have access to the premises supplied during any reasonable hour of the day for the purpose of examining the meter, fixtures and appliances connected with the water service.

For the violation of any of these rules, the company may discontinue the service upon three (3) days' notice.

Either party of this agreement may terminate it upon thirty (30) days' notice in writing. But no such termination shall take effect in behalf of the consumer unless all charges against said consumer have been paid.

The company reserves the right to discontinue the service temporarily in case of emergency or accident.

Signed the day and year above written.

........................................Applicant.

Post-office Address..............................

........... ...................For the Company.

In the presence of.........................................

### CHARGES FOR CONNECTING WITH WATER-MAINS.

| | |
|---|---|
| ½-inch tap, ½-inch meter and curb-stop set | $18 00 |
| ⅝-inch tap, ¾-inch meter and curb-stop set | 24 00 |
| ¾-inch tap, 1-inch meter and curb-stop set | 32 00 |
| 1-inch tap, 1¼-inch meter and curb-stop set | 55 00 |
| Two 1-inch taps, one 1½-inch meter and curb-stop set | 60 00 |

Larger sizes at special rates.

| TITLE OF WATER COMPANY. | AUTHORITY MAKING CONTRACT. | DATE OF CONTRACT. | EXPIRATION OF CONTRACT. | TERRITORY COVERED. |
|---|---|---|---|---|
| *Borough of Brooklyn.* | | | | |
| Long Island Water Supply Company | Town of New Lots | Sept. 15, 1881 | Sept. 15, 1906 | Town of New Lots |
| Long Island Water Supply Company | " | July 2, 1885 | " 15, " | " |
| Flatbush Water Works Company | City of Brooklyn | June 2, 1896 | Dec. 31, 1900 | Twenty-ninth Ward, Brooklyn |
| *Borough of Queens.* | | | | |
| Queens County Water Company | Village of Far Rockaway | Jan. 28, 1896 | Aug. 1, 1901 | Village of Far Rockaway |
| Queens County Water Company | Arverne-by-the-Sea | Nov. 27, 1897 | July 1, 1902 | Arverne-by-the-Sea |
| Queens County Water Company | Village of Rockaway Beach | Dec. 28, " | " 1, " | Village of Rockaway Beach |
| Citizens' Water Supply Company | Town of Newtown | Jan. 6, 1894 | Jan. 6, 1904 | Town of Newtown |
| Citizens' Water Supply Company | The City of New York | May 19, 1898 | May 19, 1901 | Long Island City |
| Jamaica Township Water Company | Village of Jamaica | June 8, 1894 | May 1, 1899 | Richmond Hill District |
| Jamaica Township Water Company, successors to Jamaica Water Supply Company | " | Apr. 6, 1897 | Apr. 23, 1902 | Jamaica Village |
| Jamaica Water Supply Company | Town of Jamaica | Dec. 30, " | Dec. 30, " | Richmond Hill District |
| Jamaica Water Supply Company | " | " 30, " | " 30, " | Queens Water Supply District |
| Jamaica Water Supply Company | " | " 30, " | " 30, " | Hollis Water Supply District |
| Woodhaven Water Supply Company | " | " 17, " | " 17, 1917 | Woodhaven District |
| *Borough of Richmond.* | | | | |
| Staten Island Water Supply Company | Village of New Brighton | Mar. 10, 1897 | Mar. 10, 1902 | Village of New Brighton |
| Staten Island Water Supply Company | Town of Northfield | Apr. 2, " | Five years from time of setting hydrant | Town of Northfield |
| Staten Island Water Supply Company | Village of Port Richmond | June 8, " | June 8, 1902 | Village of Port Richmond |
| Crystal Water Company | Village of Edgewater | May 28, " | May 28, " | Village of Edgewater |
| " | Town of Southfield | Dec. 18, " | Dec. 18, " | Southfield, outside of any incorporated village therein |
| " | Town of Northfield | " 22, " | " 22, " | Northfield, outside of any incorporated village therein |

| Source of Supply. | Daily Capacity of Supply. | Rates to Consumers. | Hydrant Rates Per Annum. | |
|---|---|---|---|---|
| | Gallons. | | | |
| Wells............. | ........ | Same as Brooklyn........ | 100 hydrants, at $100..........<br>50 hydrants, at $75...........<br>50 hydrants, at $35........... | |
| " ............ | 5,000,000 | Same as Brooklyn......... | 22 hydrants, no charge.........<br>Other hydrants, $35........... | |
| " ............ | 7,000,000 | Same as Brooklyn.......... | $30,000 per annum | |
| Wells............. | ........ | ................. | $20 per hydrant.. | |
| " ............ | 5,000,000 | Rates attached... | 20 " .. | |
| " ............ | ........ | ................. | 20 " .. | |
| " ............ | ........ | ................. | 100 hydrants, at $25.........<br>100 hydrants, at $20.........<br>Other hydrants, at $18...... | Extended for 10 years from January 6, 1904. |
| " ............ | 7,000,000 | Rates attached. | $65 per 1,000,000 gallons......... | |
| " ............ | ........ | ................. | $20 per hydrant.. | Superseding contract of March 1, 1890. |
| " ............ | 5,000,000 | Same as Brooklyn......... | 22 hydrants, at $16.........<br>100 hydrants, at $20.........<br>Other hydrants, at $18...... | Contract to be renewed every 5 years until Village of Jamaica buys plant. |
| " ............ | ....... | ................. | $20 per hydrant.. | |
| " ............ | ........ | Rates attached .. | 20 " .. | |
| " ............ | ........ | ................. | 20 " .. | |
| " ............ | 2,000,000 | Same as Brooklyn......... | 20 " | Contract cancels contract of June 15, 1894. |
| Wells............. | ........ | ................. | $25 per hydrant.. | Renewal of contract of May 20, 1890. |
| " ............ | 8,000,000 | Rates attached... | 25 " | Privileges granted by contract are perpetual, except for hydrants, which shall not be less than 5 years. |
| " ............ | ........ | .............. | 25 "<br>27 50 "<br>25 " | Renewal of contract of June 1, 1890. |
| " ............ | ........ | ................. | 30 " | Village has option of four 5-year renewals. |
| " ............ | ........ | ................. | 40 " | Village has option of four 5-year renewals. |
| " ............ | 5,000,000 | Rates attached .. | 25 " | Village has option of four 5-year renewals. |

| TITLE OF WATER COMPANY. | AUTHORITY MAKING CONTRACT. | DATE OF CONTRACT. | EXPIRATION OF CONTRACT. | TERRITORY COVERED. |
|---|---|---|---|---|
| Crystal Water Company.. | Town of Middletown .... | Dec. 24, 1897 | Dec. 24, 1902 | Middletown, outside of any incorporated village therein .......... |
| West End Water Company | Town of Westfield....... | Nov. 3, " | Nov. 3, " | Westfield, outside of any incorporated village therein .............. |
| *Borough of The Bronx.* | | | | |
| New York and Westchester Water Company.............. | Town of Pelham ........ | July 20, 1891 | July 20, 1896 | Town of Pelham......... |
| New York and Westchester Water Company.............. | Town of Westchester.... | Sept. 7, 1893 | Sept. 7, 1903 | Town of Westchester .... |
| New York and Westchester Water Company.............. | Village of Wakefield..... | 1895 | 1905 | Village of Wakefield ..... |
| New York and Westchester Water Company....... ....... | Village of Williamsbridge.............. | June 5, 1895 | June 5, 1905 | Village of Williamsbridge. |
| Upper New York City Water Company.... | Village of Eastchester... | May 17, " | May 17, " | Village of Eastchester.... |

| SOURCE OF SUPPLY. | DAILY CAPACITY OF SUPPLY. | RATES TO CONSUMERS. | HYDRANT RATES PER ANNUM. | |
|---|---|---|---|---|
| | Gallons. | | | |
| Wells ............. | ........ | ................. | $40 per hydrant | Village has option of four 5-year renewals. |
| " ............. | ........ | ................. | 40 " | Village has option of four 5-year renewals. |
| Wells. Hutchinson Creek.... | ........ | ................. | $40 per hydrant.. | |
| Bronx River Supply and wells. | 1,500,000 | Rates attached .. | 40 " | Continuation of contract of November 3, 1890. |
| Bronx River Supply and wells. | ........ | ................. | 40 " | Continuation and extension of contract of January 5, 1891. |
| Bronx River Supply and wells. | ........ | ................. | 40 " | Renewal of contract of November 6, 1890. |
| Bronx River and Hutchinson Creek........ | 1,500,000 | ................. | 40 " .. | |

## REPORT OF THE WATER REGISTER.

### BOROUGHS OF MANHATTAN AND THE BRONX.

DEPARTMENT OF WATER SUPPLY,
OFFICE OF WATER REGISTER, MANHATTAN AND BRONX,
NEW YORK, January, 1899.

WILLIAM DALTON, Esq., *Commissioner of Water Supply:*

DEAR SIR—I herewith transmit a schedule of the charitable institutions exempt from taxation, which is copied from a previous annual report, together with those that have been exempted during the year 1898. Also a statement of the amount of revenue derived from Croton water from the year 1842 up to and including December 31, 1897, copied from a former annual report, together with the revenues derived from Croton water for the year 1898, and also a statement of the entire amount of money received in this office during the year 1898, as more particularly set forth in that part of my report.

*Charitable Institutions which have Applied for Exemption from Charges for Croton Water under the Provisions of Chapter 696 of the Laws of 1887, as Amended by Chapter 492, Laws of 1890, which the Counsel to the Corporation has Advised are Entitled to Exemption under the Act.*

| Year. | INSTITUTION. | RATED. | LOCATION. | AMOUNT. |
|---|---|---|---|---|
| 1888 | Association for the relief of Aged and Indigent Females | Regular rents | Tenth avenue and One Hundred and Fourth street | $45 00 |
| 1889 | Asylum of St. Vincent de Paul | Meter | No. 211 West Thirty-ninth street | 309 70 |
| 1891 | Association for Befriending Children and Young Girls | " | No. 132 Second avenue | 12 50 |
| 1894 | American Female Guardian Society | Regular rents | Nos. 225 and 227 East Eightieth street | 51 00 |
| 1888 | Baptist Home for Aged and Infirm Persons | Meter | Fourth avenue and East Sixty-eighth street | 128 30 |
| 1888 | Colored Orphan Asylum | " | One Hundred and Forty-third street and Northern Boulevard | 639 20 |
| 1894 | Children's Aid Society | " | No. 27 St. Mark's place | 14 00 |
| 1894 | " | " | Nos. 242 and 244 William street | 30 00 |
| 1894 | " | " | No. 287 East Broadway | 35 00 |
| 1894 | " | " | Nos. 127 and 129 Avenue B | 17 00 |
| 1894 | " | " | No. 307 East Twelfth street | 17 00 |
| 1894 | " | " | Nos. 825 and 827 Second avenue | 18 00 |
| 1894 | " | " | Nos. 400 and 402 Seventh avenue | 17 00 |
| 1892 | Die Deutsche Poliklinik | Regular rents | No. 78 Seventh street | 16 00 |
| 1890 | Day Nursery and Babies' Shelter | " | No. 118 West Twenty-first street | 20 00 |
| 1888 | French Benevolent Society | " | No. 131 West Fourteenth street | 27 00 |
| 1888 | German Hospital Dispensary | Meter | Nos. 135 and 137 Second avenue | 55 60 |
| 1888 | German Hospital and Dispensary | " | Park avenue and Seventy-seventh street | 724 70 |
| 1894 | Good Samaritan Dispensary | " | Northwest corner Broome and Essex streets | 17 00 |

| Year. | INSTITUTION. | RATED. | LOCATION. | AMOUNT |
|---|---|---|---|---|
| 1888 | Hebrew Sheltering and Guardian Society | Meter | Northeast corner Eighty-seventh street and Avenue A | $190 90 |
| 1888 | Hebrew Sheltering and Guardian Society | " | West side Boulevard, One Hundred and Fiftieth and One Hundred and Fifty-first street | 801 80 |
| 1888 | Home for Aged and Indigent Women | " | Southeast corner Tenth avenue and One Hundred and Fourth street | 180 10 |
| 1888 | Home for Aged and Infirm Hebrews | " | Nos. 119 and 127 West One Hundred and Twenty-fifth street | 282 30 |
| 1888 | Hebrew Benevolent and Asylum Society | " | West side of Tenth avenue, between One Hundred and Thirty-sixth and One Hundred and Thirty-eighth streets | 2,441 30 |
| 1889 | Home of Good Shepherd and St. Ann's Home | Regular rents | Southeast corner of Eighty-ninth street and Avenue A | 38 80 |
| 1888 | Hahnemann Hospital | Meter | East side of Fourth avenue, between Sixty-seventh and Sixty-eighth streets | 447 60 |
| 1890 | Home for Old Men and Aged Couples | Regular rents | Nos. 487 to 491 Hudson street | 32 00 |
| 1889 | Home for the Aged of the Little Sisters of the Poor | Meter | Nos. 201 to 215 East Seventieth street | 175 50 |
| 1889 | Home for the Aged of the Little Sisters of the Poor | " | North side of West One Hundred and Sixth street, between Ninth and Tenth avenues | 175 10 |
| 1888 | Home of the Good Shepherd | " | Foot of East Ninetieth street | 640 00 |
| 1888 | Home of the Good Shepherd | " | Southeast corner Avenue A and Ninetieth street | 327 80 |
| 1888 | Leake and Watts Orphan Home | " | West One Hundred and Tenth street and Ninth avenue | 96 30 |
| 1887 | Manhattan Dispensary and Hospital | Regular rents | One Hundred and Thirty-first street and Tenth avenue | 32 00 |
| 1888 | Manhattan Eye and Ear Hospital | Meter | No. 103 Park avenue | 247 90 |
| 1888 | Methodist Episcopal Church Home | " | Nos. 1584 to 1602 Tenth avenue | 219 00 |
| 1889 | Montefiore Home for Chronic Invalids | " | Boulevard and West One Hundred and Thirty-fifth street | 497 60 |
| 1888 | Mount Sinai Hospital | " | East side of Lexington avenue, between Sixty-sixth and Sixty-seventh streets | 1,091 60 |
| 1894 | Margaret Strachen Home | " | Nos. 103 and 105 West Twenty-seventh street | 23 00 |
| 1892 | New York Institution for the Blind | " | East side of Ninth avenue, between Thirty-third and Thirty-fourth streets | 1,048 00 |
| 1888 | New York Foundling Asylum | " | Third and Lexington avenues, between Sixty-eighth and Sixty-ninth streets | 1,220 80 |
| 1888 | New York Foundling Asylum | " | Spuyten Duyvil | 128 40 |
| 1888 | New York Asylum for Lying-in Women | Regular rents | No. 139 Second avenue | 12 00 |
| 1888 | New York Cancer Hospital | Meter | Southwest corner One Hundred and Sixth street and Eighth avenue | 269 10 |
| 1888 | New York Hospital and Bloomingdale Asylum | Meter | Nos. 7 to 21 West Fifteenth street<br>No. 8 West Sixteenth street; also Boulevard, between One Hundred and Seventeenth and One Hundred and Eighteenth streets | 2,740 50<br>1,402 20 |
| 1894 | New York Hospital and Bloomingdale Asylum | " | Hudson street, between Jay and Staple streets | 18 00 |
| 1888 | New York Homœopathic Hospital | Regular rents | West side Avenue A, between Sixty-third and Sixty-fourth streets | 50 00 |
| 1888 | New York Ophthalmic Hospital | Meter | No. 201 East Twenty-third street | 122 50 |
| 1894 | New York Post-Graduate Medical School, etc | " | Nos. 344, 346 and 348 Second avenue<br>Nos. 350 and 352 Second avenue and No. 303 East Twentieth street | 153 00<br>8 00 |
| 1888 | New York Society for the Relief of Ruptured and Crippled | " | No. 135 East Forty-second street | 454 50 |
| 1889 | New York Infirmary for Women and Children | Regular rents | Nos. 4 and 5 Livingston place | 39 00 |
| 1889 | New York Mothers' Home for the Sisters of Misericorde | " | No. 531 East Eighty-sixth street | 21 00 |

| Year. | Institution. | Rated. | Location. | Amount. |
|---|---|---|---|---|
| 1888 | Nursery and Child's Hospital | Meter | No. 571 Lexington avenue | $577 70 |
| 1891 | New York Juvenile Asylum | " | East side Eleventh avenue, between One Hundred and Seventy-sixth and One Hundred and Seventy-eighth streets | 1,662 20 |
| 1890 | New York Eye and Ear Infirmary | " | No. 218 Second avenue | 70 00 |
| 1894 | New York Orthopædic Dispensary and Hospital | Regular rents | Nos. 126 and 128 East Fifty-ninth street. | 48 00 |
| 1888 | Protestant-Episcopal Orphan Home and Asylum | Meter | East Forty-ninth street, between Lexington and Fourth avenues | 241 90 |
| 1888 | Presbyterian Hospital | " | Park avenue and East Seventieth street. | 756 70 |
| 1890 | Peabody Home for Aged and Indigent Women | Regular rents | Boston road and Clover street | ........ |
| 1888 | Roman Catholic Orphan Asylum | " | East side Fifth avenue, between Fifty-first and Fifty-second streets<br>South side East Fifty-second street, between Fifth and Madison and Madison and Fourth avenues | 1,709 00<br>........ |
| 1888 | Roosevelt Hospital | Meter | South side West Fifty-ninth street, between Ninth and Tenth avenues | 1,040 90 |
| 1887 | Sisters of the Order of St. Dominick. | Regular rents | Nos. 137 to 143 Second street | 40 00 |
| 1888 | Skin and Cancer Hospital | Meter | No. 243 East Thirty-fourth street, Fordham Heights | 120 00 |
| 1888 | Sloane Maternity Hospital | " | Fifty-ninth street and Tenth avenue | 144 90 |
| 1888 | St. Elizabeth Hospital | " | No. 225 West Thirty-first street | 32 60 |
| 1888 | St. Francis Hospital | " | No. 609 Fifth street | 450 30 |
| 1888 | St. Joseph's Hospital | Regular rents | East One Hundred and Forty-third and East One Hundred and Forty-fourth streets, between St. Ann's and Brook avenues | 15 00 |
| 1888 | St. Luke's Hospital | Meter | No. 27 West Fifty-fourth street | 760 10 |
| 1888 | St. Vincent's Hospital | " | Nos. 152 to 162 West Eleventh street and Nos. 160 to 174 West Twelfth street<br>Also Nos. 17 and 19 Seventh avenue | 308 20<br>110 00 |
| 1888 | St. James' Home | Regular rents | No. 26 James and No. 22 Oliver streets | 34 00 |
| 1888 | St. Philip's Parish House | " | No. 127 West Thirtieth street | 10 00 |
| 1888 | St. Joseph's Home for the Aged | " | No. 211 West Fifteenth street | 200 90 |
| 1888 | St. Joseph's Orphan Asylum | " | North side Eighty-ninth street, between First avenue and Avenue A. | 9 00 |
| 1888 | St. Mary's Free Hospital for Children | Meter | Nos. 405 and 407 West Thirty-fourth street | 138 10 |
| 1888 | Society for the Relief of Half Orphans and Destitute Children | Regular rents | Manhattan avenue, between One Hundred and Fourth and One Hundred and Fifth streets | 227 50 |
| 1890 | St. Mary's Lodging House | " | No. 143 West Fourteenth street | 33 00 |
| 1891 | St. Joseph's Industrial Home | " | No. 65 East Eighty-first street | 240 00 |
| 1890 | Sheltering Arms | " | South side One Hundred and Twenty-ninth street, between Amsterdam avenue and Broadway | 34 40 |
| 1890 | " | " | West side Amsterdam avenue, between Lawrence Street and Broadway | 116 00 |
| 1890 | " | " | North side Lawrence street, between Amsterdam avenue and Broadway | 21 85 |
| 1891 | St. Joseph's Institute for the Improved Instruction of Deaf Mutes | " | Lorillard place, between One Hundred and Eighty-eighth and One Hundred and Eighty-ninth streets | 24 00 |
| 1885 | St. Joseph's Home. Not exempt since 1887 | Meter | Nos. 145 and 147 East Twenty-eighth street | 300 40 |
| 1892 | St. Elizabeth Industrial School | Regular rents | No. 235 East Fourteenth street | 20 00 |

| Year. | Institution. | Rated. | Location. | Amount. |
|---|---|---|---|---|
| 1888 | Trinity Corporation | Meter | No. 50 Varick street | $86 40 |
| 1888 | The Orphan Asylum of the City of New York | " | West Seventy-third street, between Eleventh avenue and Riverside drive | 435 60 |
| 1888 | The Laura Franklin Free Hospital | " | Nos. 15 and 17 East One Hundred and Eleventh street | 115 60 |
| 1890 | The Home for the Aged of the Church of the Holy Communion | Regular rents | No. 330 First avenue | 11 00 |
| 1890 | The St. Mark's Hospital | " " | No. 117 Second avenue | 34 00 |
| 1890 | The Five Points House of Industry | Meter | Nos. 147 and 155 Worth street | 10 30 |
| 1890 | The Colored Home and Hospital | " | First avenue, between Sixty-fourth and Sixty-fifth streets | 1,309 50 |
| 1890 | The New York Society for the Prevention of Cruelty to Children | Regular rents | Nos. 100 and 102 East Twenty-third street | 36 00 |
| 1890 | The Babies' Hospital | " | No. 657 Lexington avenue | 29 00 |
| 1891 | The House of Mercy | Meter | Fourteenth avenue, between Two Hundred and Thirteenth and Two Hundred and Fifteenth streets | 189 00 |
| 1890 | The Guardian of the Sisterhood of the Holy Communion | Regular rents | No. 328 Sixth avenue | 27 00 |
| 1892 | The Samaritan Home for the Aged | " | No. 414 West Twenty-second street | 28 00 |
| 1892 | The Institution for Improved Instruction of Deaf Mutes | Meter | West side Lexington avenue, from Sixty-seventh to Sixty-eighth street | 1,018 40 |
| 1892 | The New York Home for Convalescents | Reg. rents | No. 433 East One Hundred and Eighteenth street | 10 00 |
| 1892 | The Free Home for Destitute Young Girls | " | No. 23 East Eleventh street | 16 95 |
| 1892 | The American Female Guardian Society | " | No. 32 East Thirtieth street, through to No. 29 East Twenty-ninth street | 62 00 |
| 1893 | The Harlem Eye, Ear and Throat Infirmary | " | No. 144 East One Hundred and Twenty-seventh street | 9 00 |
| 1893 | The Louis Downtown Sabbath and Daily School | " | No. 267 Henry street | 20 00 |
| 1892 | The House of the Holy Comforter | " | No. 149 Second avenue | 38 00 |
| 1892 | The Home for Incurables | Meter | Block bounded by Third avenue, Kingsbridge and Quarry roads | 1,139 30 |
| 1862 | The Sisters of the Good Shepherd | Regular rents | Nos. 417 and 419 West Nineteenth street | 22 00 |
| 1893 | The Young Women's Christian Association | Meter | No. 7 East Fifteenth street, and Nos. 14 and 16 East Sixteenth street | 328 10 |
| 1888 | Woman's Hospital | " | Fiftieth street and Park avenue | 595 10 |
| 1891 | West Side Day Nursery | Regular rents | No. 266 West Fortieth street | 8 00 |
| 1891 | Women's Home | Meter | No. 110 Second avenue | 82 50 |
| 1894 | Young People's American House | Regular rents | No. 1147 First avenue | 20 00 |
| 1895 | Baron de Hirsch Fund Institution, by advice of Commissioner of Public Works, May 14, 1895 |  | East Broadway and Market street | 687 10 |
| 1895 | Beth Israel Hospital Association, by advice of Commissioner of Public Works, September 10, 1895 |  | No. 206 East Broadway and No. 195 Division street | 131 70 |
| 1895 | Columbus Hospital, by advice of Commissioner of Public Works, November 19, 1895 |  | No. 226 East Twentieth street | 63 90 |
| 1895 | Congregation Kol Adahas Jeshuruni, by advice of Commissioner of Public Works, December 19, 1895 |  | Nos. 12 to 16 Eldridge street | 654 66 |
| 1895 | Demilt Dispensary, by advice of Commissioner of Public Works, March 18, 1895 |  | No. 245 East Twenty-third street | 598 40 |
| 1895 | Isabella Heimath, by advice of Commissioner of Public Works, January 29, 1895 |  | One Hundred and Ninetieth street and Amsterdam avenue | 1,136 25 |
| 1895 | New York Polyclinic and Hospital, by advice of Commissioner of Public Works, January 25, 1895. |  | Nos. 214 to 216 East Thirty-fourth street. | 350 50 |

| Year. | Institution. | Rated. | Location. | Amount. |
|---|---|---|---|---|
| 1895 | New York Infant Asylum, by advice of Commissioner of Public Works, January 3, 1895...... | ............. | Amsterdam avenue and Sixty-first street | $12 00 |
| 1895 | New York Ophthalmic and Aural Institution, by advice of Commissioner of Public Works, March 27, 1895 ..................... | ............. | Nos. 44 and 46 East Twelfth street...... | 11 00 |
| 1895 | New York Protestant Episcopal City Society, by advice of Commissioner of Public Works, July 22, 1895 ..................... | ............. | Nos. 330 and 332 Broome street......... | 11 10 |
| 1895 | St. Mark's Hospital, by advice of Commissioner of Public Works, May 1, 1893.................. | ............. | No. 177 Second avenue................ | 34 00 |
| 1895 | Society of the Lying-in Hospital of The City of New York, by advice of the Commissioner of Public Works, March 22, 1895.. | ............. | No. 251 East Seventeenth street......... | 2 30 |
| 1895 | Silver Cross Day Nursery, by advice of Commissioner of Public Works, October 18, 1895...... | ............. | No. 242 East One Hundred and Twentieth street.................. | 10 00 |
|  | Exemption transferred to December 29, 1897 .................. | ........ .... | Nos. 249 to 251 East One Hundred and Seventeenth street ........... | 18 00 |
| 1895 | St. Joseph's Day Nursery, by advice of Commissioner of Public Works, December 26, 1895..... | ............. | No. 473 West Fifty-seventh street ...... | 32 70 |
| 1895 | Hebrew Technical Institute, by advice of Commissioner of Public Works, March 25, 1895...... | ............. | Nos. 34 and 36 Stuyvesant street........ | 366 30 |
| 1895 | Webb's Academy and Home for Shipbuilders, by advice of Commissioner of Public Works, June 20, 1895..... .................. | ............. | Southeast corner Sedgwick avenue and Academy street .............. | 357 90 |

### *Charitable Institutions which have Applied for Exemption from Charges for Croton Water, under the Provisions of the Law above referred to and Laws of* 1896, *Chapter* 852, *for the Year* 1896, *and Exempted.*

| Institution. | Location. |  |
|---|---|---|
| Die Deutsche Ploliklinik of the State of New York, by advice of Commissioner of Public Works, December 11, 1896 .................. | No. 80 Seventh street........................ | 17 00 |
| Hebrew Institute, Aguilar Free Library and the Hebrew Free School Association, by advice of Commissioner of Public Works, August 31, 1896 ..................................... | Nos. 191–197 East Broadway.................. | 401 80 |
| Missionary Sisters of the Third Order of St. Francis, by advice of Commissioner of Public Works, November 12, 1896. ................. | No. 12 West One Hundred and Twenty-ninth street.................................. | 11 00 |
| New York Magdalen Benevolent Society, by advice of Commissioner of Public Works, June 8, 1896...................................... | One Hundred and Thirty-ninth street and North river .... ........................ | 63 00 |
| New York Ladies' Home Missionary Society of the Methodist Episcopal Church, known as the Five Points Mission, by advice of Commissioner of Public Works, August 31, 1896.... | Nos. 61 and 63 Park street.................... | 152 40 |
| New York Skin and Cancer Hospital, by advice of Commissioner of Public Works, December 14, 1896 ..................................... | Nos. 301 and 303 East Nineteenth street, and Nos. 330 to 332 Second avenue........... | 15 00 |
| St. Zita's Home for Friendless Women of the City, by advice of Commissioner of Public Works, May 21, 1896 .............................. | Nos. 123 and 125 East Fifty-second street ..... | 22 00 |
| St. Agnes' Nursery, by advice of Commissioner of Public Works, October 27, 1896........... | No. 7 Charles street......................... | 12 00 |
| The Seton Hospital, by advice of Commissioner of Public Works, July 31, 1896 ............... | West Side Spuyten Duyvil Parkway.......... | 1,076 40 |

| INSTITUTION. | LOCATION. | |
|---|---|---|
| Wilson Industrial School, by advice of Commissioner of Public Works, September 26, 1896... | No. 125 St. Mark's place... | $49 00 |
| Wetmore Home, by advice of Commissioner of Public Works, November 25, 1896............ | No. 141 West Fourth street.................. | 9 00 |
| West Side German Dispensary, by advice of Commissioner of Public Works, December 11, 1896.................................. | No. 328 West Forty-second street............ | 34 00 |
| St. Elizabeth's Industrial School, by advice of Commissioner of Public Works, November 28, 1896.......................................... | No 237 East Fourteenth street.............. | 22 00 |

*Charitable Institutions which have Applied for Exemption from Charges for Croton Water under the Provisions of the Law above Referred to and Laws of* 1896, *Chapter* 852, *for the Year* 1897, *and Exempted.*

| INSTITUTION. | RATED. | LOCATION. | |
|---|---|---|---|
| Children's Aid Society, by advice of Commissioner of Public Works, December 9, 1897................................ | Meter........<br>Regular rates | 156 Leonard street.................<br>256 Mott street....................<br>630 Sixth street....................<br>219 Sullivan street.............. ....<br>28 Pike street.......................<br>173-175 Rivington street...........<br>217 East Twenty-first street........<br>407 East Seventy-third street.......<br>338 East Eighty-eighth street......<br>533 East Sixteenth street...........<br>537-539 East Sixteenth street.......<br>224 West Sixty-third street........ | 10,623 90<br>533 35 |
| Chapin Home for the Aged and Infirm, by advice of Commissioner of Public Works, December 17, 1897...................... | Meter....... | 151 East Sixty-sixth street. ........... | 67 80 |
| Home for Old Men and Aged Couples, by advice of Commissioner of Public Works, July 2, 1897............................ | Regular rates | Amsterdam avenue and One Hundred and Twelfth street.......... | 114 00 |
| Metropolitan Throat Hospital, by advice of Commissioner of Public Works, May 10, 1897.......................................... | " | 351 West Thirty-fourth street......... | 11 00 |
| Manhattan Eye and Ear Hospital, by advice of Commissioner of Public Works, July 2, 1897.............................. | " | 102 East Forty-first street ............ | ........ |
| Missionary Society of the Most Holy Redeemer, by advice of Commissioner of Public Works, September 20, 1897....... | " | 4-6 Thompson street...............<br>328 West Broadway .............. | 69 00<br>33 00 |
| New York Infirmary for Women and Children, by advice of Commissioner of Public Works, November 9, 1897............ | ....... ..... | 2 Livingston street.... ............. | 17 00 |
| People's baths, by advice of Commissioner of Public Works, October 5, 1897........ | ............. | 9 Centre Market place................ | 1,310 60 |
| St. Mary's Lodging House, by advice of Commissioner of Public Works, January 27, 1897 ................................ | ............. | 144 West Fifteenth street........ ..... | 9 00 |
| St. Philip's Parish House, by advice of Commissioner of Public Works, February 5, 1897 ................................ | ............. | 1119 Boston avenue.................. | ........ |

| INSTITUTION. | RATED. | LOCATION. | |
|---|---|---|---|
| St. Lawrence Free School, by advice of Commissioner of Public Works, January 28, 1897 | ............ | South side East Eighty-fourth street, between Park and Madison avenues | $25 00 |
| St. Ann's Free School, by advice of Commissioner of Public Works, October 28, 1897 | ............ | 113-117 East Eleventh street | 70 00 |
| St. Joseph's Asylum, by advice of Commissioner of Public Works, December 29, 1897 | Regular rates | North side East Eighty-ninth street, between First avenue and Avenue A | 31 00 |

*Charitable Institutions which have applied for Exemption from Charges for Croton Water, under the provisions of the Law above referred to and Laws of* 1896, *chapter* 852, *for the Year* 1898, *and Exempted.*

| INSTITUTION. | RATED. | LOCATION. | |
|---|---|---|---|
| Brightside Bay Nursery and Kindergarten, by advice of Corporation Counsel, June 15, 1898 | Regular rates | No. 141 Suffolk street | 11 00 |
| Halsey Day Nursery of St. Thomas P. E. Church, by advice of Corporation Counsel, February 26, 1898 | " | No. 227 East Fifty-ninth street | 30 00 |
| Lebanon Hospital Association, by advice of Commissioner of Water Supply, December 27, 1898 | " | North side Westchester avenue, between Trinity and Cauldwell avenues | 151 20 |
| Manhattan State Hospital, Ward's Island, and Ferry-house, One Hundred and Sixteenth street, East river, by advice of Corporation Counsel, September 19, 1898 | Meter | ............ | 2,443 66 |
| New York Association for Improving the Condition of the Poor, by advice of Corporation Counsel, January 24, 1898. | Regular rates | No. 411-413 West Forty-sixth street | 31 00 |
| New York Juvenile Asylum, by advice of Commissioner of Water Supply, December 5, 1898 | ............ | Eleventh avenue, One Hundred and Seventy-sixth to One Hundred and Seventy-seventh street | ........ |
| New York Skin and Cancer Hospital, by advice of Commissioner of Water Supply, December 5, 1898 | Regular rates | No. 305 East Nineteenth street | 9 20 |
| Riverside Association, by advice of Corporation Counsel, June 9, 1898 | Meter | No. 259 West Sixty-ninth street | 1,260 50 |
| St. Patrick's Cathedral School | ............ | Nos. 113 to 119 East Fiftieth street | ........ |
| St. Patrick's School | ............ | Nos. 272-274 Mott street; Nos. 32-38 Prince street | ........ |
| Cathedral Library, by advice of Corporation Counsel, February 11, 1898 | Regular rates | No. 123 East Fiftieth street | 332 00 |
| St. Catherine Literary Society, by advice of Commissioner of Water Supply, November 25, 1898 | ............ | South side East Sixty-ninth street | 80 00 |
| St. Joseph's Institute for the Improved Instruction of Deaf Mutes, by advice of Corporation Counsel, October 7, 1898 | Regular rates | No. 772 East One Hundred and Eighty-eighth street | 198 60 |
| | | | $55,833 32 |

### *Applications Received for which Exemption has been Refused during the Year* 1895.

| INSTITUTION. | LOCATION. |
|---|---|
| Armitage House, by advice of Commissioner of Public Works, February 4 or 21, 1895 | No. 343 West Forty-seventh street. |
| New York Protestant Episcopal City Society, by advice of Commissioner of Public Works, June 29, 1895 | No. 38 Bleecker street and Nos. 113 and 115 Broome street. |
| New York Parochial School, by advice of Commissioner of Public Works, January 3, 1895 | No. 151 Thompson street. |
| St. John's Guild, by advice of Commissioner of Public Works, November 23, 1895 | No. 157 West Sixty-first street. |

### *Applications Received for which Exemption has been Refused during the Year* 1896.

| INSTITUTION. | LOCATION. |
|---|---|
| Church of St. Ignatius Loyola, by advice of Commissioner of Public Works, July 18, 1896 | Southwest corner Park avenue and Eighty-fourth street. |
| Congregation Mount Zion, by advice of Commissioner of Public Works, November 13, 1896 | No. 65 East One Hundred and Thirteenth street. |
| Congregation Atens Zwie, by advice of Commissioner of Public Works, November 25, 1896 | Nos. 347–349 East One Hundred and Twenty-first street. |
| Dominican Convent of Our Lady of the Rosary, by advice of Commissioner of Public Works, September 24, 1896. | Nos. 329–335 East Sixty-third street. |
| Five Points House of Industry, by advice of Commissioner of Public Works, February 21, 1896 | No. 155 Worth street. |
| German-American School Association, by advice of Commissioner of Public Works, December 14, 1896 | Nos. 244–246 East Fifty-second street. |
| House of the Holy Family, by advice of Commissioner of Public Works, October 27, 1896 | No. 132 Second avenue. |
| Jewish Theological Seminary, by advice of Commissioner of Public Works, September 24, 1896 | No. 736 Lexington avenue. |
| Manhattan East Side Mission, by advice of Commissioner of Public Works, June 8, 1896 | Nos. 416–422 East Twenty-sixth street. |
| New York Catholic Protectory, by advice of Commissioner of Public Works, July 18, 1896 | Nos. 415–417 Broome street. |
| New York Protestant Episcopal City Mission Society, by advice of Commissioner of Public Works, December 2, 1896 | Nos. 113 and 115 Thompson street. |
| New York Frotestant Episcopal City Mission Society, by advice of Commissioner of Public Works, December 7, 1896 | No. 307 Mulberry street. |
| Presbyterian Church of the Sea and Land, by advice of Commissioner of Public Works, November 9, 1896 | No. 61 Henry street. |
| St. Joseph's Institute for the Improved Instruction of Deaf Mutes, by advice of Commissioner of Public Works, July 24, 1896 | Bayard and Hoffman streets. |
| School Sisters of St. Agnes, by advice of Commissioner of Public Works, August 27, 1895 | No. 232 East One Hundred and Thirteenth street. |
| The Tabernacle Baptist Church, by advice of Commissioner of Public Works, May 22, 1896 | No. 162 Second avenue. |
| The Tabernacle Baptist Church, by advice of Commissioner of Public Works, October 27, 1896 | Nos. 164, 166 and 168 Second avenue. |
| The New York Christian Home for Intemperate Men, by advice of Commissioner of Public Works, June 8, 1896. | No. 1175 Madison avenue. |
| United Hebrew Charities, by advice of Commissioner of Public Works, November 5, 1896 | No. 58 St. Mark's place. |
| Vanderbilt Clinic, by advice of Commissioner of Public Works, July 6, 1896 | Sixtieth street and Amsterdam avenue. |

## *Applications Received for which Exemption has been Refused during the Year* 1897.

| INSTITUTION. | LOCATION. |
|---|---|
| Beth Israel Hospital Association, by advice of Commissioner of Public Works, March 31, 1897 | No. 206 East Broadway and No. 195 Division street. |
| Congregation Kol Israel Poland, by advice of Commissioner of Public Works, February 26, 1897 | No. 20 Forsyth street. |
| Congregation Ahawath Achim Auschie Ungarn, by advice of Commissioner of Public Works, October 30, 1897 | No. 70 Columbia street. |
| East Side House, by advice of Commissioner of Public Works, March 10, 1897 | Nos. 540 and 542 East Seventy-sixth street. |
| Female Academy of the Sacred Heart, by advice of Commissioner of Public Works, November 3, 1897 | Nos. 44 to 48 West Eighteenth street. |
| Fifth Avenue Swimming School, Bath and Gymnasium, by advice of Commissioner of Public Works, February 26, 1897 | Nos. 2 and 4 East Forty fifth street. |
| Loretto Free School, by advice of Commissioner of Public Works, April 9, 1897 | No. 209 and 301 Elizabeth street. |
| New York Hospital, by advice of Commissioner of Public Works, October 1, 1897 | No. 10 West Sixteenth street. |
| New York Sanitarian Hospital, by advice of Commissioner of Public Works, November 3, 1897 | No. 247 West Forty-ninth street. |
| St. Joseph s Institution for the Improved Instruction of Deaf Mutes, by advice of Commissioner of Public Works, October 30, 1897 | No. 772 East One Hundred and Eighty-eighth street. |
| St. Mark's Hospital, by advice of Commissioner of Public Works, March 4, 1897 | No. 220 East Thirteenth street. |
| St. James Free School Society, by advice of Commissioner of Public Works, September 9, 1897 | Nos. 25 to 29 James street. |
| St. Michael's Free School, by advice of Commissioner of Public Works, August 25, 1897 | Nos. 401 and 403 West Thirty-first street, No. 406 West Thirty-second street, Nos. 373 to 383 Ninth avenue. |
| St. Mary Magdalen School, by advice of Commissioner of Public Works, September 23, 1897 | No. 525 East Seventeenth street. |
| St. Francis Zavier's College, by advice of Commissioner of Public Works, September 24, 1897 | Nos. 151 and 153 West Nineteenth street. |
| St. Jerome's School, by advice of Commissioner of Public Works, November 24, 1897 | Northeast corner Alexander avenue and One Hundred and Thirty-seventh street. |
| Talmud Torah School, by advice of Commissioner of Public Works, May 27, 1897 | Nos. 225 and 227 East Broadway. |
| Woman's Hospital, by advice of Commissioner of Public Works, May 12, 1897 | No. 558 Lexington avenue. |

## *Applications Received for which Exemption has been Refused During the Year* 1898.

| INSTITUTION. | LOCATION. |
|---|---|
| Dominican Convent of Our Lady of the Rosary, by advice of Corporation Counsel, April 19, 1898 | 329 to 335 East Sixty-third street, 120 East Sixty-fifth street. |
| General Theological Seminary, by advice of Corporation Counsel, February 25, 1898 | Ninth avenue, Twentieth and Twenty-first streets. |
| Henry Keep Flower Memorial Building and Chapel, by advice of Corporation Counsel, February 26, 1898 | 229 and 231 East Fifty-ninth street, 230 East Sixtieth street. |
| Roman Catholic Parochial Schools—Assumption, Epiphany, Holy Cross, Holy Innocents, Immaculate Conception, Our Lady of Angels, Our Lady of Mount Carmel, St. Anthony, St. Bridget, St. Columbia, St. Francis of Assissi, St. Gabriel's, St. Jerome, St. James, St. Jean Baptiste, St. John Baptist, St. Mary's, St. Monica's, St. Michael's, St. Paul, St. Paul the Apostle, St. Stephen, St. Teresa, Sacred Heart of Jesus, St. Vincent de Paul, St. Vincent Ferrer, St. Francis College, St. Mary Magdalene, Transfiguration, by advice of Corporation Counsel, October 10, 1898 | |
| Sisters of Bon Secours, by advice of Corporation Counsel, June 3, 1898 | 1195 Second avenue. |
| Young Men's Christian Association, by advice of Corporation Counsel, December 15, 1898 | 318 West Fifty-seventh street. |

I have the honor to also submit a statement of moneys received for the year ending December 31, 1898, and placed to the credit of their respective accounts with the City Chamberlain, together with the amounts returned to the Bureau of Arrears:

TOTAL RECEIPTS.

| | PRINCIPAL. | PENALTIES. | TOTAL. |
|---|---|---|---|
| *Regular Rates.* | | | |
| Quarter ending March 31 | $36,015 34 | $1,743 00 | $37,758 34 |
| " June 30 | 585,420 95 | 1,382 40 | 586,803 35 |
| " September 30 | 880,543 45 | 3,264 75 | 883.808 20 |
| " December 31 | 233,262 06 | 8,023 80 | 241,285 86 |
| | $1,735,241 80 | $14,413 95 | $1,749,655 75. |
| *Street Sprinkling.* | | | |
| Quarter ending March 31 | .......... | ............ | 28,000 00 |
| " June 30 | $14,000 00 | | |
| " September 30 | 14,000 00 | | |
| " December 31 | .......... | | |
| *Meter Measurement.* | | | |
| Meters outside of Riverdale and exclusive of Steamboat Meters— | | | |
| Quarter ending March 31 | 516,870 05 | ............ | 2,070,513 72 |
| " June 30 | 517,740 15 | | |
| " September 30 | 500,368 55 | | |
| " December 31 | 535.534 97 | | |
| Riverdale Meters— | | | |
| Quarter ending March 31 | 978 60 | ............ | 4,671 60 |
| " June 30 | 1,377 60 | | |
| " September 30 | 432 80 | | |
| " December 31 | 1,882 60 | | |
| Steamboat Meters— | | | |
| Quarter ending March 31 | 27,805 10 | ............ | 109,458 74 |
| " June 30 | 13,062 60 | | |
| " September 30 | 44,238 44 | | |
| " December 31 | 24,352 60 | | |
| *Miscellaneous.* | | | |
| Building Purposes— | | | |
| Quarter ending March 31 | 9,111 80 | ............ | 40,575 74 |
| " June 30 | 8,777 45 | | |
| " September 30 | 10.567 00 | | |
| " December 31 | 12,119 49 | | |
| Permits issued, 1383. | | | |

| | PRINCIPAL. | PENALTIES. | TOTAL. |
|---|---|---|---|
| Extras, Boilers, etc.— | | | |
| Quarter ending March 31 | $1,068 80 | ............ | $4,084 52 |
| " June 30 | 735 00 | | |
| " September 30 | 1,243 50 | | |
| " December 31 | 1,037 22 | | |
| Permits issued, 241. | | | |
| Tugs— | | | |
| Quarter ending March 31 | 3,160 00 | ............ | 18,548 00 |
| " June 30 | 6,262 50 | | |
| " September 30 | 3,105 50 | | |
| " December 31 | 6,020 00 | | |
| Permits issued, 640. | | | |
| Taps— | | | |
| Quarter ending March 31 | 2,917 00 | ............ | 15,547 50 |
| " June 30 | 3,262 50 | | |
| " September 30 | 5,733 00 | | |
| " December 31 | 3,635 00 | | |
| Permits issued, 3711. | | | |
| Amount set down as revenue | ............ | ............ | $4,041,055 57 |
| *Repairing Streets.* | | | |
| January 1 to March 12 | $2,982 00 | ............ | 2,982 00 |
| Permits issued, 310. | | | |
| This account transferred to the Department of Highways, March 12, 1898. | | | |
| *Meter Setting Fund No. 2.* | | | |
| Quarter ending March 31 | 410 06 | ............ | 816 17 |
| " June 30 | 172 57 | | |
| " September 30 | 233 54 | | |
| " December 31 | .......... | | |
| Total receipts | ............ | ............ | $4,044,853 74 |
| *Returned to Bureau of Arrears.* | | | |
| Regular rates | ............ | $172,356 26 | 418,348 60 |
| Meter measurements | ............ | 245,992 34 | |
| Meter Setting Fund No. 2 | ............ | 6,584 74 | |
| Total revenue received | ............ | ............ | $4,041,055 57 |
| Total revenue from Croton Water returned to Bureau of Arrears | ............ | ............ | 418,348 60 |
| Grand total | ............ | ............ | $4,459,404 17 |

| | |
|---|---|
| Number of meters placed from January 1, 1898, to December 31, 1898 | 852 |
| Total number of meters in use December 31, 1898 | 35,442 |

In the boroughs of Manhattan and The Bronx, there are 4,817 houses which are only partly metered, distributed as follows :

| | | | |
|---|---|---|---|
| Section 1 | 574 | Section 7 | 253 |
| " 2 | 997 | " 8 | 10 |
| " 3 | 857 | " 9 | 102 |
| " 4 | 633 | Ward 24 | 2 |
| " 5 | 854 | | |
| " 6 | 535 | Total | 4,817 |

| | |
|---|---|
| Total receipts for 1898 | $4,025,508 07 |
| Total receipts for 1897 | 3,917,597 70 |
| Increase 1898 over 1897 | $107,910 37 |

All of which is most respectfully submitted.

Very respectfully,

WM. G. BYRNE, Water Registrar.

## REVENUE.

The following table exhibits the yearly revenue derived from Croton water from its introduction into the city in the year 1842 to January 1, 1898, copied from former Water Register's report, together with the revenue from January 1, 1898, to January 1, 1899 :

| | | Statement of Arrears of Water Rents Returned to the Comptroller, Clerk of Arrears, according to Law, and Collected by Clerk of Arrears. | TOTAL REVENUE. |
|---|---|---|---|
| From October 5, 1842, to May 1, 1843 | $32,053 74 | .......... | $32,053 74 |
| From May 1, 1843, to May 1, 1844 | 84,444 68 | .......... | 84,444 68 |
| " 1, 1844, " 1, 1845 | 117,227 86 | .......... | 117,227 86 |
| " 1, 1845, " 1, 1846 | 163,900 52 | .......... | 163,900 52 |
| " 1, 1846, " 1, 1847 | 193,346 24 | .......... | 193,346 24 |
| " 1, 1847, " 1, 1848 | 219,416 72 | .......... | 219,416 72 |
| " 1, 1848, " 1, 1849 | 250,081 51 | .......... | 250,081 51 |
| " 1, 1849, to December 31, 1849 | 259,532 97 | .......... | 259,532 97 |
| From January 1, 1850, to December 31, 1850 | 458,951 87 | .......... | 458,951 87 |
| " 1, 1851, " 31, 1851 | 458,789 78 | $30,379 20 | 489,168 98 |

| | | Statement of Arrears of Water Rents Returned to the Comptroller, Clerk of Arrears, according to Law, and Collected by Clerk of Arrears. | TOTAL REVENUE. |
|---|---|---|---|
| From January 1, 1852, to December 31, 1852 | $578,426 48 | $22,329 55 | $600,756 03 |
| " 1, 1853, " 31, 1853 | 650,021 20 | 22,230 66 | 672,251 86 |
| " 1, 1854, " 31, 1854 | 703,730 83 | 35.032 45 | 738,763 28 |
| " 1, 1855, " 31, 1855 | 790,077 70 | 47,382 34 | 837,460 04 |
| " 1, 1856, " 31, 1856 | 778,292 77 | 57,670 46 | 835,963 23 |
| " 1, 1857, " 31, 1857 | 823,156 35 | 57,671 60 | 880,827 95 |
| " 1, 1858, " 31, 1858 | 840,928 08 | 62,892 92 | 903,821 00 |
| " 1, 1859, " 31, 1859 | 855,266 47 | 55,410 05 | 910,671 52 |
| " 1, 1860, " 31, 1860 | 868,843 58 | 48,005 51 | 916,849 09 |
| " 1, 1861, " 31, 1861 | 891,430 81 | 50,836 98 | 942,267 79 |
| " 1, 1862, " 31, 1862 | 893,896 82 | 62,738 23 | 956,635 05 |
| " 1, 1863, " 31, 1863 | 982,031 26 | 55,331 11 | 1,037,362 37 |
| " 1, 1864, " 31, 1864 | 1,006,191 77 | 50,536 18 | 1,056,727 95 |
| " 1, 1865, " 31, 1865 | 1,056,772 49 | 49,478 75 | 1,106,251 24 |
| " 1, 1866, " 31, 1866 | 1,125,605 96 | 41,219 45 | 1,166,825 41 |
| " 1, 1867, " 31, 1867 | 1,261,600 30 | 45,023 65 | 1,306,623 95 |
| " 1, 1868, " 31, 1868 | 1,312,093 05 | 42,436 15 | 1,354,529 20 |
| " 1, 1869, " 31, 1869 | 1.315,676 13 | 39,844 05 | 1,355,520 18 |
| " 1, 1870, to April 9, 1870 | 77,641 95 | 49,155 60 | 126,797 55 |
| From April 11, 1870, to April 10, 1871 | 1,296,383 79 | 51,223 30 | 1,347,607 09 |
| " 11, 1871, " 10, 1872 | 1,353,591 59 | 49,428 15 | 1,403,019 74 |
| " 10, 1872, " 30, 1873 | 1,439,349 39 | 50,660 25 | 1,490,009 64 |
| " 30, 1873, to December 31, 1873 | 1,386,132 41 | 48,039 53 | 1,434,171 94 |
| From January 1, 1874, to January 1, 1875 | 1,477.277 06 | 57,721 38 | 1,534,998 44 |
| " 1, 1875, " 1, 1876 | 1,444,256 71 | 66,652 10 | 1,510,908 81 |
| " 1, 1876, " 1, 1877 | 1,478,281 00 | 67,677 50 | 1,545,958 50 |
| " 1, 1877, " 1, 1878 | 1,470,329 60 | 70.641 21 | 1,540,970 81 |
| " 1, 1878, " 1, 1879 | 1,606,509 29 | 60,219 35 | 1,675,728 64 |
| " 1, 1879, " 1, 1880 | 1,618,722 50 | 76,043 09 | 1,694,765 59 |
| " 1, 1880, " 1, 1881 | 1,560,598 57 | 69,633 70 | 1,630,232 27 |
| " 1, 1881, " 1, 1882 | 1,510,791 77 | 93,552 56 | 1,604,344 33 |
| " 1, 1882, " 1, 1883 | 1,647,183 25 | 100,743 81 | 1,747,927 06 |
| " 1, 1883, " 1, 1884 | 1.869,518 96 | 169,558 61 | 2,039,077 57 |
| " 1, 1884, " 1, 1885 | 1,985,329 32 | 164,689 55 | 2,150,018 87 |

| | | Statement of Arrears of Water Rents Returned to the Comptroller, Clerk of Arrears, according to Law, and Collected by Clerk of Arrears. | TOTAL. REVENUE. |
|---|---|---|---|
| From January 1, 1885, to January 1, 1886 | $2,122,411 83 | $117,041 07 | $2,239,452 90 |
| " 1, 1886, " 1, 1887 | 2,343.792 61 | 165,425 18 | 2,509,217 79 |
| " 1, 1887, " 1, 1888 | 2,514.343 92 | 154,043 30 | 2,668,387 22 |
| " 1, 1888, " 1, 1889 | 2 437,962 66 | 149.100 25 | 2,587,062 91 |
| " 1, 1889, " 1, 1890 | 2,544,650 07 | 237,401 27 | 2,782,051 34 |
| " 1, 1890, " 1, 1891 | 2,675,135 86 | 304,869 38 | 2,980,005 24 |
| " 1, 1891, " 1, 1892 | 3,056,168 66 | 441,679 69 | 3,497,848 35 |
| " 1, 1892, " 1, 1893 | 3,002,647 35 | 272,764 01 | 3,275,411 36 |
| " 1, 1893, " 1, 1894 | 3,590,357 88 | 338,162 25 | 3,928,520 13 |
| " 1, 1894, " 1, 1895 | 3.363.796 16 | 435,882 87 | 3,799,679 03 |
| " 1, 1895, " 1, 1896 | 3,522,840 24 | 409,462 62 | 3,932,302 86 |
| " 1, 1896, " 1, 1897 | 3,723,375 22 | 499,806 11 | 4,223,181 33 |
| " 1, 1897, to December 31, 1898 | 3,917,597 70 | 416,885 66 | 4,334,483 36 |
| " 1, 1898, to January 1, 1899 | 4,025,508 07 | .......... | 4,025,508 07 |